

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

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EDITORIAL COMMENT



IMES of economic stringency seem to have only one thing in their favour. They teach Government departments to avoid actual extravagances. The Air Minister in his Memorandum, which accompanies the Air Estimates, admits that a number of economies of a permanent character have been effected, and doubtless other departments have also been able to detect and remove certain cases of spending which were not really necessary for efficiency.

The Air Estimates

In the piping times of surpluses, Government departments are usually apt to grow a little careless in such matters, and private business concerns sometimes do the same. Such extravagances probably provide a little extra employment and make all the staff concerned a little more comfortable, and no one is any the worse except the taxpayers and the shareholders respectively. In some cases the extra expenditure may save some members of the staff concerned from overwork and consequent loss of health, but in the main they are not to be approved, and the combing out which leads to their abolition is a good thing. But there is little doubt that when good times return fresh outlets for superfluous expenditure will be found, and the temptation to indulge in them will not be resisted.

Other results of the search for economy are less gratifying. The Air Estimates are down by £700,000 net, and the Air Minister states that it has only been possible to achieve so large a reduction by the postponement of many services which under normal conditions would be regarded as essential, and by makeshift expedients which cannot be repeated. The Navy and the Army Estimates have a similar tale to tell. The First Lord of the Admiralty says that "it would be impossible to frame future Navy Estimates on the same basis as has been adopted this year without making the most serious inroads into the strength and efficiency of the Fleet." The Secretary of State for War says that "This reduction of expenditure has only been achieved with the greatest difficulty by resorting to a drastic suspension or retardation of many services which are essential

DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

1932

- Mar. 12. No. 10 Sqdn. R.A.F. Reunion Dinner at Ye Olde Pindar of Wakefield, Gray's Inn Road, W.C.
- Mar. 12. Rugby: De Havilland v. Nuneaton Old Edwardians at Stag Lane Aerodrome.
- Mar. 16. "Development of Naval Air Work," Lecture by Commodore N. F. Laurence, before R.U.S.I.
- Mar. 23. "High-Speed Flying," Lecture by Sqdn.-Ldr. A. H. Orlebar, before R.U.S.I.
- Mar. 24-28. London Gliding Club's Meeting at Dunstable.
- Mar. 30. R.Ae.C. Annual General Meeting.
- Apr. 1. Entries close at ordinary fees for King's Cup Race.
- Apr. 1. Opening of Greek Aero Show, Athens.
- Apr. 2. Rugby: Army v. R.A.F., at Twickenham.
- Apr. 2-10. National Aircraft Show, Detroit, U.S.A.
- Apr. 7. "Wing Construction," Lecture by H. J. Stieger, before R.Ae.S.
- Apr. 13. "The North-West Frontier of India," Lecture by Maj.-Gen. S. F. Muspratt, before R.U.S.I.
- Apr. 14. "Aero Engine Accessories," Lecture by W. L. Taylor, before R.Ae.S.
- Apr. 21. "Air Port Development," Lecture by N. Norman, before R.Ae.S.
- Apr. 23. No. 45 Sqdn. R.A.F. Reunion Dinner at Crown and Cushion Rest, London Wall.
- May 1. Entries close at double fees for King's Cup Race.
- May 7. Heston Spring Cruise begins.
- May 14. Coventry Ae.C. Air Pageant.
- May 14-15. Skegness Air Pageant.
- May 16. Northampton Ae.C. Flying Meeting.
- May 18. Household Brigade Flying Club Meeting, Heston.
- May 21. Morning Post Race, Heston.
- May 21-23. Scottish Flying Club Display, Moorpark, Renfrew.
- May 22. Husbands Bosworth Flying Meeting.
- May 22-30. Conference of Transoceanic Aviators at Rome.
- May 28. London-Newcastle Air Race for "Newcastle Evening World" Trophy.
- May 28. Brooklands Meeting.
- June 4. Bristol Airport Summer Flying Meeting.
- June 4. Cardiff Flying Meeting.
- June 4. Leicester Ae.C. Flying Display and Motor Gymkhana at Ratcliffe Aerodrome.
- June 5. Reading Ae.C. At Home, Woodley Aerodrome.
- June 11. Leicester Ae.C. Meeting, Desford.
- June 18. Hull Air Display.
- June 25. R.A.F. Display, Hendon.

to the well-being and efficiency of the Army." Both the Army and the Air Force have found their main source of economy in making the unfortunate soldiers and airmen continue to inhabit barracks and quarters which ought to be improved or replaced. What with reduced pay and antiquated quarters, no one can say that the men of the fighting services are not bearing their full share, and perhaps a little bit over, of the burden of the present hard times. We feel sure that they will bear their burden as cheerfully as the other classes of the nation have borne theirs. Grumbling there may be—it is the traditional right of the British fighting man to grumble even when he is very well off—but, in reality, he will, we are sure, grin and bear things as cheerfully as the direct taxpayer has borne the mulcting of one-quarter of his income by the Chancellor of the Exchequer. We sympathise deeply with the airman who has to go on living in an old war-time hut, which ought to go on the scrap heap, but in the circumstances it would be no use to raise a complaint. At the same time, we have no sympathy with those who think that it is easy to balance a Budget by cutting down expenditure on the fighting services. Until war has become an impossibility we must have fighting services, and we must have them efficient, however small they may be. The present economies threaten the efficiency of all the services. We most fervently hope that next spring there will be no such dire need to save pennies regardless of efficiency, and that the services will then be restored to a proper footing in all respects.

About the Air Estimates themselves there is very little to say. It is gratifying, though it was expected as a matter of course, that no economy has been adopted which will make it more dangerous for a pilot to go into the air. That no new squadrons or flights are to be formed in the present year was also to be expected. This is the fourth time when the 1922 programme of 52 squadrons for home defence has been postponed. The strength of the command Air Defence of Great Britain stands at 42 squadrons, of which five are cadre squadrons and eight belong to the Auxiliary Air Force. Our air defence is certainly run on economical lines.

Vote 3 (Technical and Warlike Stores) shows a decrease of £322,000 net on the figure for last year. This is a decrease of 4 per cent., and the net total stands at £7,350,000. Of this a sum of £2,657,000 is for buying complete aeroplanes (a decrease of £791,000), and £1,746,000 is for complete engines (an increase of £40,000). It is surprising and gratifying to see even a small increase under any heading, and especially under this one. This is balanced, however, by a reduction of £40,000 on engine spares, so that the engine manufacturers as a body will be no better and no worse off than they were last year. The rest of the industry fares worse. There is no alteration in the amount set aside for machine spares, parachutes, and miscellaneous items, which stands at £900,000, as last year. Consequently there will be over a quarter of a million pounds less than last year to go to the construction of machines and accessories. The aircraft firms between them have to saddle this heavy loss. The

industry as a whole has been going through a trying time, and we feel the utmost sympathy for them. In particular we realise the hardships laid on many skilled men, draughtsmen and others, who have to suffer from reduction of staffs. Consolation must be looked for in the protest of the Air Minister that such expedients as have been adopted in the present abnormal year cannot be repeated, and also in the growing general confidence that the country is now on the verge of a general revival of prosperity. When things improve we feel sure that our rulers will not forget that this country cannot be safe in war or ready to advance in commercial air transport unless our aircraft industry is in a healthy and flourishing condition. Our design staffs and our skilled operatives need security of employment if they are to give of their best, and the firms which employ them need sufficient money reserves to enable them to follow a forward policy. We cannot continue to lead the world in aircraft design and construction if our industry is in a chronic state of indisposition or, at best, convalescence.

As we said before, we are not surprised that, in the circumstances, no new squadrons of the Royal Air Force are to be formed this year. We do, however, deeply regret to read in the Memorandum of the Air Minister that the rearmament of squadrons has necessarily been curtailed. However, when the worst has been said, the fact remains that nearly five and three-quarter millions have been allocated for new machines, engines, spares and accessories. A good deal of re-equipment can be done with that sum, and we may conclude that the process of supplying squadrons with the latest types of machines will not altogether stand still. Last year, in addition to forming three new squadrons, the Air Ministry succeeded in re-equipping some fourteen squadrons, and this apart from the money which the Admiralty spent on the Fleet Air Arm. The work was spread over the financial year, and it so happens that, at the moment of writing, No. 6 (Bomber) Squadron at Ismailia is still flying Bristol Fighters. Fairey "Gordons" have been ordered for it, and they are due to be shipped out during March and April. It was a good year in the matter of re-equipment, and the worst of the anachronisms disappeared from the list of standard equipment of the Royal Air Force. But there are other types, all sound machines, which are now approaching the limit of their usefulness and must soon be replaced. There are still three fighter squadrons which have nothing more modern than "Siskins"; the Fairey III F is not so good as the Fairey "Gordon"; the Westland firm has designed an improvement on the "Wapiti" (*vide* FLIGHT of March 4); and the experiment has been made of giving one Army co-operation squadron the Hawker "Audax" in place of the "Atlas." We still wait to learn the conclusion reached about the "Hart" fighter after trying it out with one flight of No. 23 (Fighter) Squadron. A new type of night bomber is overdue, and a type of flying boat is needed for No. 510 F.B. Squadron at Pembroke Dock. There are plenty of badly-needed objects on which that 5½ millions can be spent.



Introducing



Pegasus

A New "Bristol" Engine Series

(Continued from p. 190.)

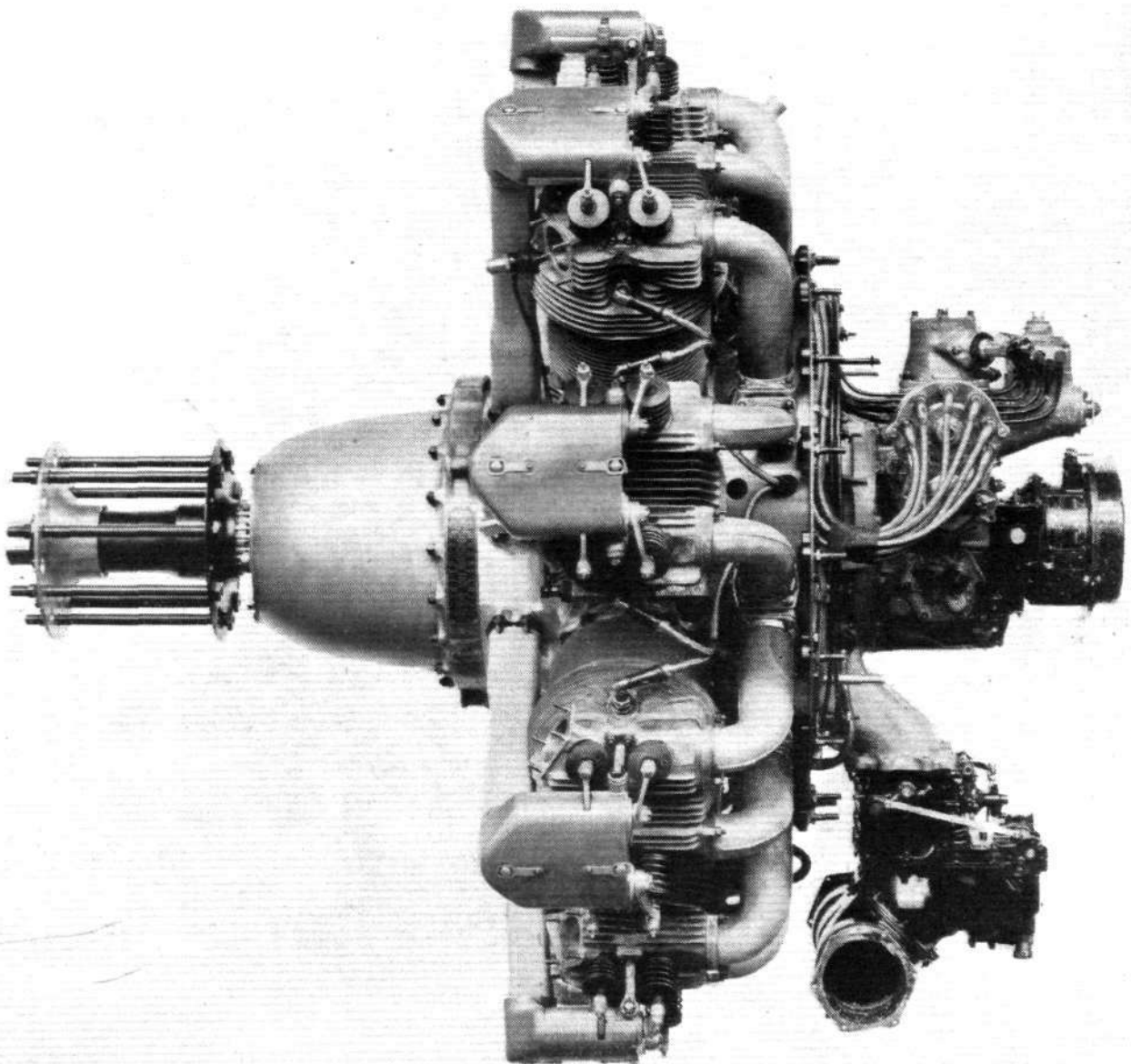
SOME of the new features introduced into the design of the Bristol "Pegasus" engines were dealt with in the article in last week's issue of FLIGHT. It is, however, worth recalling that the series was introduced to meet the modern demand for supercharging, airscrew gearing, and the fitting of low-drag engine cowling. The series is in the power range from 500 h.p. to 600 h.p., and the introduction of the new models has been preceded by a long period of development, including some thousands of hours of test bench running on main engines, followed by prolonged flight tests in various types of aircraft, in addition to a programme of single-cylinder research work extending over several years.

Following the usual Air Ministry type tests for new engines, the Bristol Company has carried out 200 hours'

running at the maximum speeds and powers ordinarily considered permissible for periods of five minutes' duration only, so that the margin of safety of the new engines should be wide enough to ensure quite remarkable reliability under actual operating conditions and normal speeds and powers.

The "Mercury" IV-S2 engine, which is intended for use in high-performance military single-seaters and two-seaters, completed an additional "special category" test at full throttle, when the power developed was no less than 770 b.h.p. at normal speed and 850 b.h.p. at maximum speed.

In addition to the new features in design mentioned last week, it should be pointed out that the new flanged conical steel plate which carries the "Pegasus" and "Mercury" engines can, if desired, be provided with rubber buffer



THE "PEGASUS" AND "MERCURY" ENGINES: Alike in side view, except for overall diameter, this photograph illustrates both types, and shows the enclosed valve rocker gear, the small casing for the airscrew reduction gear, and the accessibility of the components on the back of the engine.

dampers. These buffers surround the bolts securing the mounting plate to the aircraft frame, and further reduce the vibrations transmitted by the engine to the aircraft.

The lubrication system used in the new series of engines represents an improvement as compared with that of the "Jupiters," and as a result of extensive experimentation, a device incorporated in the oil pump system enables the engines to be safely started and very quickly run up on cold oil and in very low air temperatures. This is regarded as a very valuable and important advance, espe-

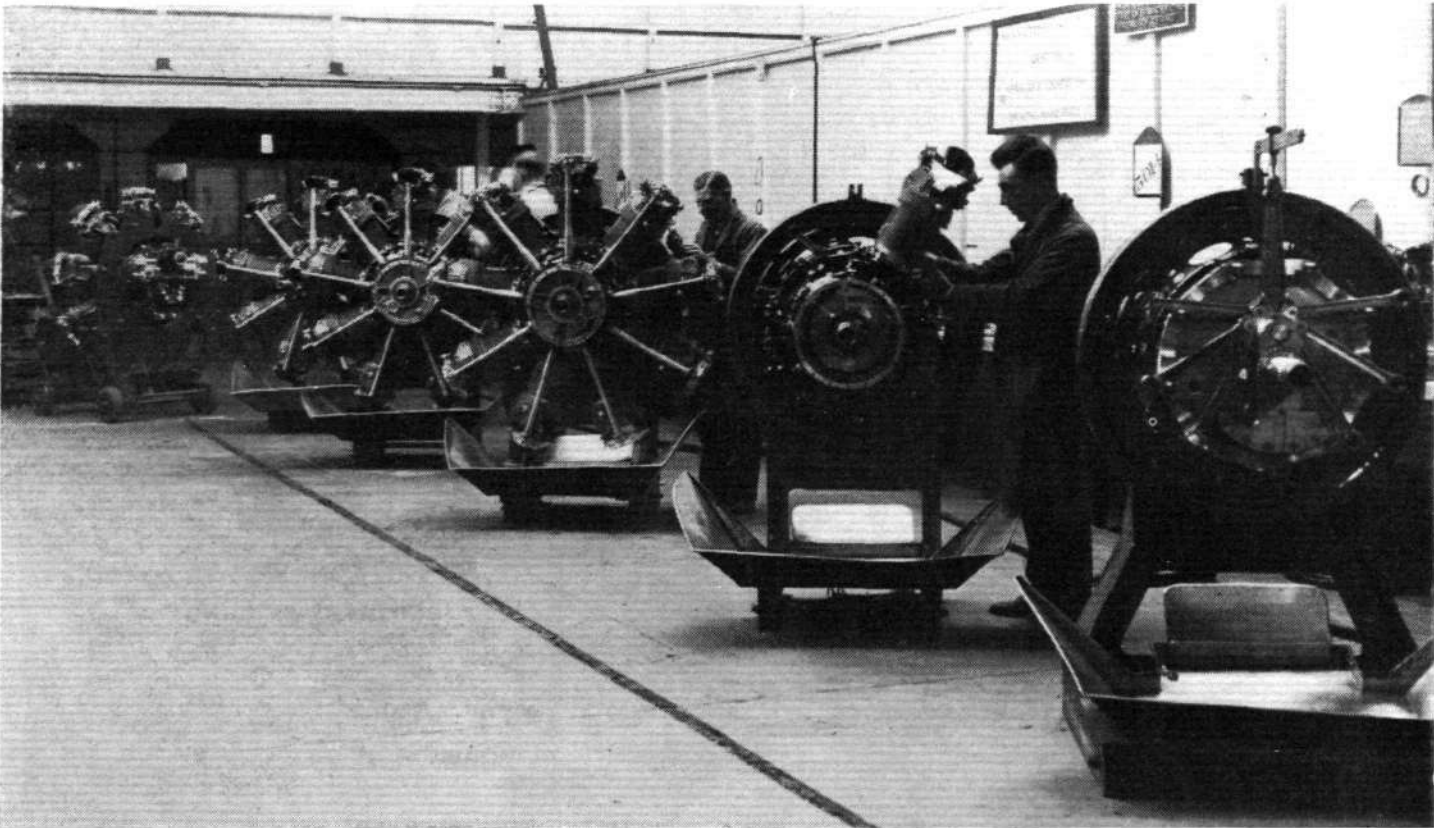
cially when the engines are used in large flying boats or seaplanes, or, of course, when they are fitted in aircraft operating in cold climates.

The problem of starting has been carefully studied, and provision is made for the use of several alternative systems, or even for several systems to be fitted together. The usual claw can be fitted on the airscrew hub for use with the Hucks starter. A distributor and non-return valves in each cylinder can be fitted for use with the Bristol gas starter, and on the rear cover, co-axial with the crank-

LEADING PARTICULARS, BRISTOL "MERCURY" AND "PEGASUS" 1932 ENGINES

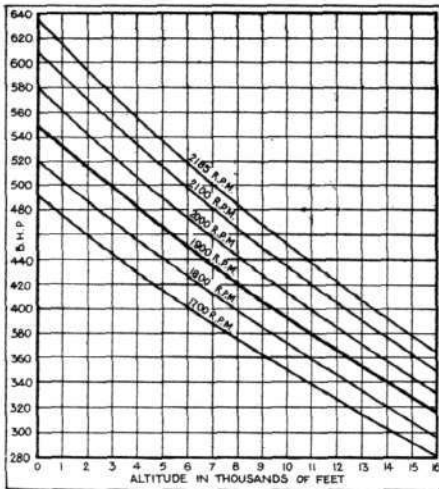
| | High Altitude Types | | | General Purpose | | | | Commercial | | | |
|---|---------------------|---------------|---------------|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Engine, type | Mercury IV-S2 | Pegasus S2 | Pegasus S3 | Pegasus M2 | Pegasus M3 | Pegasus L2 | Pegasus L3 | Pegasus U2 | Pegasus U3 | Pegasus F2 | Pegasus F3 |
| Compression ratio | 5·3 | 5·3 | | 5·3 | | 5·3 | | 5·3 | | 5·3 | |
| Airscrew | L.H. | L.H. | | L.H. | | L.H. | | L.H. | | L.H. | |
| Airscrew, r.p.m. | 0·655 | 0·655 | 0·5 | 0·655 | 0·5 | 0·655 | 0·5 | 0·655 | 0·5 | 0·655 | 0·5 |
| Engine, r.p.m. | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Normal r.p.m. { Engine .. | 2,250 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 | 1,900 | 1,900 | 2,000 | 2,000 |
| { Airscrew .. | 1,475 | 1,312 | 1,000 | 1,312 | 1,000 | 1,312 | 1,000 | 1,240 | 950 | 1,312 | 1,000 |
| Maximum r.p.m. { Engine .. | 2,600 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,300 | 2,185 | 2,185 | 2,300 | 2,300 |
| { Airscrew .. | 1,700 | 1,510 | 1,150 | 1,510 | 1,150 | 1,510 | 1,150 | 1,430 | 1,095 | 1,510 | 1,150 |
| Rated } Altitude | 13,000 ft. | 11,000 ft. | | 4,500 ft. | | 1,500 ft. | | Sea level | | Sea level | |
| alti- } B.h.p. at normal r.p.m. | 505 | 525 | | 555 | | 590 | | 550 | | 535 | |
| tude } B.h.p. at max. r.p.m. | 540 | 570 | | 615 | | 635 | | 630 | | 590 | |
| Sea level take-off b.h.p. max. for 3 min. at normal r.p.m. | 530 | 550 | | 580 | | 620 | | 550 | | 535 | |
| Automatic boost control .. | Yes | Yes | | Yes | | Yes | | No | | No | |
| Oil pressure lb./sq. in. .. | 80 | 80 | | 80 | | 80 | | 80 | | 80 | |
| Oil return, gals./hr. | 160 | 160 | | 160 | | 160 | | 160 | | 160 | |
| * Standard weight, bare, lb. .. | 920 | 960 | | 955 | | 945 | | 940 | | 930 | |
| Average cruising fuel, gals./hr. | 22 | 23 | | 23 | | 22 | | 22 | | 22 | |
| Average cruising oil, pts./hr. | 8 | 8 | | 8 | | 8 | | 8 | | 8 | |

The above ratings are based upon fuel at least equal to D.T.D.134 of 73-77 octane value.
* This weight does not include the optional or variable items of equipment.



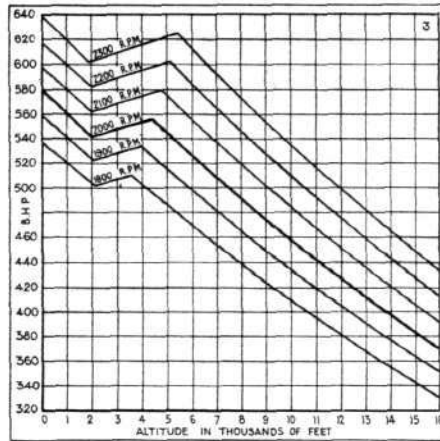
ASSEMBLY : " Pegasus " engines on their special stands. Note the accessibility of all components during assembly. The clean and uncluttered state of the shop is typical of all the Bristol engine shops. (FLIGHT Photo.)

PEGASUS—U



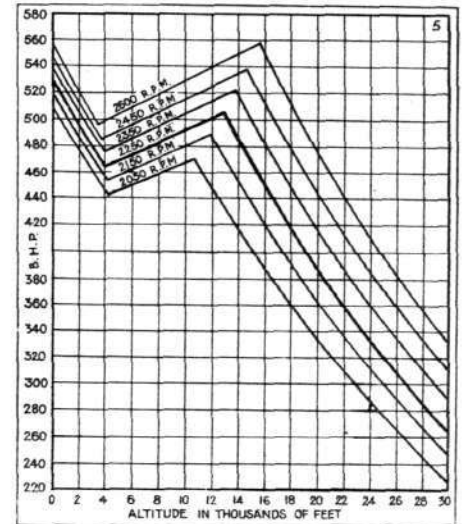
Power at Altitude at different speeds.
Normal speed 1,900 r.p.m.

PEGASUS—M



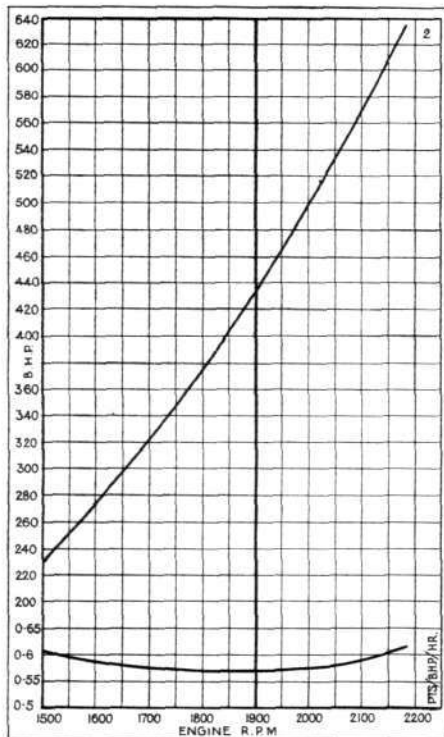
Power available at Altitude with
Automatic Boost Control.

MERCURY IV

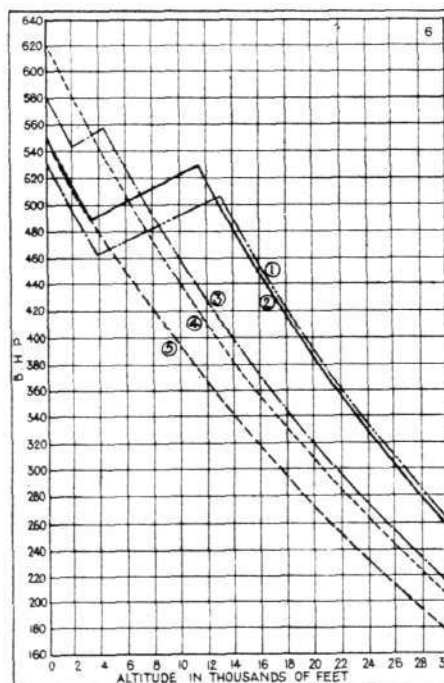


Power available at Altitude with
Automatic Boost Control.

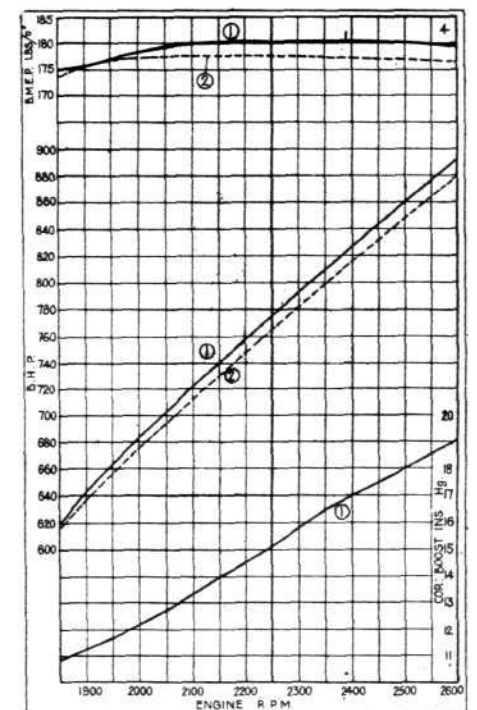
PEGASUS AND MERCURY



Throttle Consumption Curves.



COMPARATIVE POWER AT ALTI-
TITUDE : 1, "Mercury IV-S2" at
2,250 r.p.m. ; 2, "Pegasus"-S at
2,000 r.p.m. ; 3, "Pegasus"-M at
2,000 r.p.m. ; 4, "Pegasus"-L at
2,000 r.p.m., and 5, "Pegasus"-U
at 1,900 r.p.m. All speeds
"normal."



Special Category Test of "Mercury
IV" at Full Throttle. Curves 1 refer
to beginning of Endurance Test and
Curves 2 to run immediately after
completion of Endurance Test.

shaft, there is a facing to which can be bolted a hand-turning gear or an inertia starter of the manually or electrically energised type. In addition, unions are provided for priming the induction system by the usual small hand pump.

Control of the ignition timing is by automatic advance couplings on the magnetos, no hand control being needed. Further relief is given to the pilot by the adoption of the Bristol automatic boost control to the carburettor throttle. This device maintains the required maximum boost pressure in the induction system up to the rated altitude, but permits the pilot to throttle down by hand. An over-riding device can be fitted to permit the pilot to over-boost the engine to a limited extent when extra power is required for taking off.

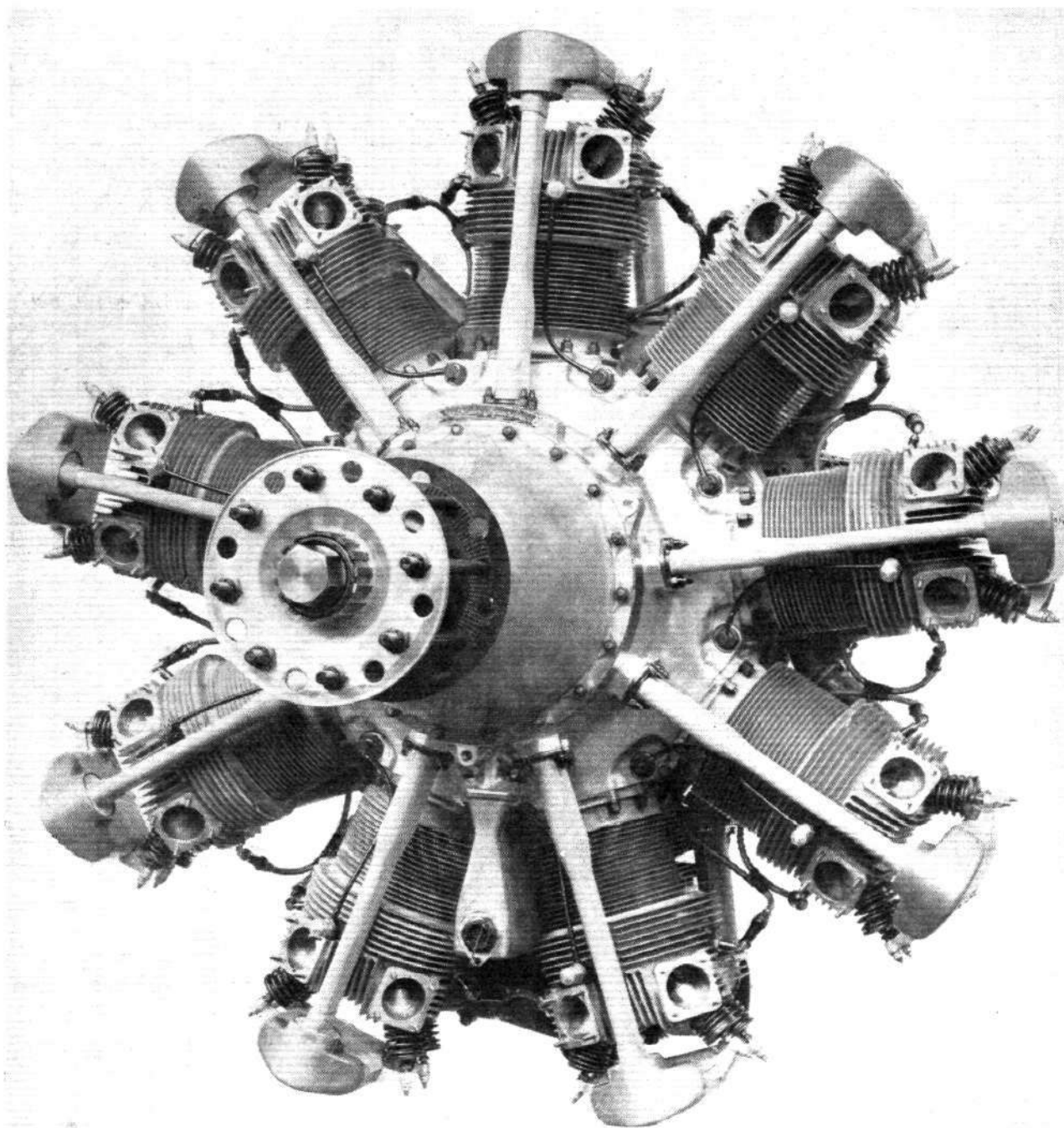
At the rear there is provision for driving a fuel pump or other accessory through a flexible shaft. This allows the fuel pump to be placed at the lowest possible position, and well away from the engine, so that the tendency for vapour locks to form in hot weather or at altitude is minimised. A combined fuel pump and relief valve can be

supplied complete with the necessary length of flexible shaft to suit any particular installation.

Another flexible shaft drive can be fitted to transmit power to a 500- or 1,000-watt electric generator. Incorporated in this drive is a combined freewheel and overload release clutch, by means of which the flexible shaft is relieved of excessive loads due to sudden changes in engine speed or to backfiring.

Reference was made last week to the re-designed airscrew reduction gears, which are now much lighter and more compact. Hubs for either wooden or metal airscrews can be supplied, and the Bristol Aeroplane Company are now producing two-bladed and three-bladed types of airscrews having light alloy blades, and these have, of course, been designed especially for the new Bristol engine series.

Finally, it may be pointed out that both the "Mercury" and the "Pegasus" series have been so designed that they may be used in pusher installations. Designers would, however, be well advised to consult the Bristol engine manufacturers before planning such installations.



THE "MERCURY" IV-S2: The overall diameter is smaller than that of the "Pegasus" and renders this engine specially suitable for single-seater fighters and other fast aircraft.

The Individual Engines

Although the main uses for which the different engines in the new series are intended were indicated last week, it may be of assistance if we refer in somewhat greater detail to this subject.

"Mercury" IV-S2.—This engine is of smaller overall diameter than the "Pegasus" series, and is intended for use in high-performance single-seater fighters and similar aircraft with a speed at altitude of 200 m.p.h. or more. The airscrew reduction gearing has a ratio of 0.655:1, with which the airscrew efficiency is considerably higher than would be a direct-drive engine running at the same speed. The supercharger has a high gear ratio and maintains the normal pressure in the induction system up to an altitude of 13,000 ft. At this height the power at normal engine speed of 2,250 r.p.m. is 505 b.h.p. The maximum power obtainable is 560 b.h.p. at 2,600 r.p.m. and at an altitude of 16,000 ft.

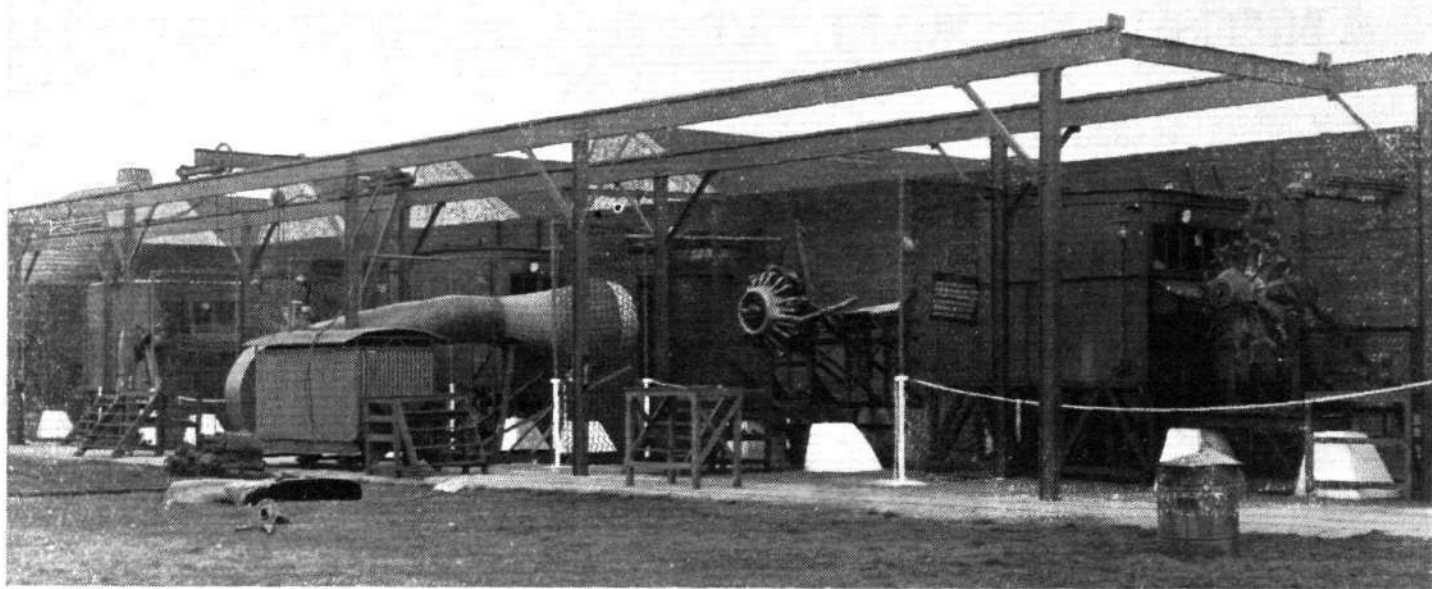
"Pegasus" S2 and S3.—Designed for use in general-purpose aircraft, these two engines are alike except for their airscrew reduction gear ratios. The supercharger is in both engines of the high-duty type, and gives a rated altitude of 11,000 ft., at which height the normal b.h.p. is 525 at 2,000 r.p.m. and maximum 570 b.h.p. at 2,300 r.p.m. These two engines are also suitable for use in civil aircraft operating normally at considerable altitudes,

but they are not intended for use in heavy flying boats or in commercial aircraft operating at moderate altitudes.

"Pegasus" M2 and M3.—For heavy flying boats and commercial aeroplanes requiring good take-off power and used at moderate altitudes, the M2 and M3 series "Pegasus" are suitable. Generally similar to the S2 and S3 engines, they have superchargers of lower output, so that their rated altitude is 4,500 ft. At that height the normal power is 555 b.h.p. at 2,000 r.p.m., and maximum power 615 b.h.p. at 2,300 r.p.m.

"Pegasus" L2 and L3.—Exactly like the S and M types except for the induction, these two engines have only low-duty blowers giving a rated altitude of 1,500 ft. Designed particularly for high take-off power, these engines are especially suitable for commercial aircraft and general service military aircraft in the East, where high performance at great altitude is not usually demanded. With a high take-off power of 620 b.h.p., the power at the rated altitude is 590 b.h.p. at the normal engine speed of 2,000 r.p.m., and as much as 635 b.h.p. at 2,300 r.p.m. The "Pegasus" L3 is regarded as particularly suitable for large flying boats which require considerable power for taking off, but which do not usually, once off the water, fly at very great altitudes.

"Pegasus" U2 and U3.—Intended for commercial aeroplanes of the large passenger type, these engines resemble,



THE TEST HOUSES : Extensive bench tests are carried out on all Bristol engine types, both on complete engines and on single-cylinder units. (FLIGHT Photo.)

and are largely interchangeable with, the other "Pegasus" engines. Instead of superchargers, they are provided with geared induction fans. With a rated engine speed of only 1,900 r.p.m., at which 550 b.h.p. is developed, the maximum power is 630 b.h.p. at 2,185 r.p.m. The full 550 b.h.p. is available for take-off at normal speed. These engines can be cruised indefinitely at their rated speed, but naturally at somewhat reduced throttle opening.

"Pegasus" F2 and F3.—Except for the fact that they

are fitted with fans mounted directly on the crankshaft and serving to give better distribution, these engines are similar to the others in the "Pegasus" series. They are suitable for commercial aircraft requiring but moderate performance at altitude, and have the merit of extreme simplicity of the induction system. The rated normal power at sea level is 535 b.h.p. at 2,000 r.p.m., and maximum power of 590 b.h.p. at maximum engine speed of 2,300 r.p.m.

BUSINESS MEN TAKE THE AIR

FLYING north recently, we had to keep at a low altitude, and it was borne home to us that aviation is already commonplace. During the trip we noticed amazingly few children who vouchsafed us even a passing glance. The majority never lifted their heads. This is a most hopeful sign, and can but mean that flying is now taken for granted by the present generation. It is about time they did, for solid business can hardly materialise until people fly or send their letters by air without thinking twice about it.

On Saturday, March 5, a large body of business men—the Executives Association of Great Britain, Ltd.—were entertained to lunch at Heston by Airwork, Ltd. This visit was organised by Henlys, Ltd., who, as our readers already know, have an aircraft agency at Heston. Mr. F. Hough (Director of Henlys) was in the chair, and after a most excellent lunch (for which full credit should be accorded to Miss Slade, the organiser of the club amenities), he made a short speech of welcome, admitting that, although he himself had not as yet flown, he proposed to rectify that omission after lunch was over. He then introduced his aviation manager, Mr. Allen, who in turn introduced the various aviation personalities present.

Mr. Nigel Norman (Director of Airwork) welcomed the presence of the Association because, he said, they were exactly the sort of people who should be encouraged to become interested in aviation. He sketched the history of Heston, which dated from a time three years and one month ago. He stressed the importance of their Customs service, and pointed out that already over 1,200 aircraft had cleared Customs at Heston. Mr. Norman referred to the other facilities offered, and disclosed the fact that full night-lighting equipment was being installed—the Chance floodlight already being at Heston—which would make Heston the only privately operated airport available for night landings.

Mr. H. E. Stiles, Chairman of the Association, and on whom the responsibility of its foundation rests, said that he also had not yet flown, but that he hoped to do so shortly. He, in a witty speech, thanked Airwork for their courtesy and congratulated Henlys on their enterprise. It was, he said, undoubtedly an outing in accordance with the tenets of the Association. In conclusion, he quoted an American principal of his who had never yet landed from the boat in England; he always flew from Paris, as

he found that thereby he got through his work more quickly and wasted less time.

A move was then made to the aerodrome, where various aircraft were on show. "Avians" and "Moths" were clustered around, the "Junkers F.13," the "Spartan Mailplane," the "Civilian Coupé," the "Hendy 302," a "Desoutter" and some "Puss Moths." At one end was the "Redwing" and the other the C.24 cabin "Autogiro," while almost lost alongside the "Junkers" was a Comper "Swift." The engines were also in variety, there being the "Hermes," "Gipsy" I, II and II, "Genet II" and "Genet Major," "Pobjoy," and "Junkers."

We were fortunate in having Mr. Stiles himself to escort round the display, and were very interested to hear his views, as being those of a busy man who wished to use aircraft solely as means of rapid transport. The first point which emerged was that comfort and finish should, from the point of view of this class of passenger, be considered equally as important as performance. Almost all the members of this Association appeared to think the "Junkers F.13" the most attractive aircraft to fly in, which suggests that English manufacturers do not pay enough attention to finish. Maj. Clark, of Personal Flying Services, was kept very busy taking the visitors up in this machine, and all, including Mr. Stiles, thoroughly enjoyed their experience.

Mr. Hough went up with Mr. Stace in one of his "Sports Avians," and discovered that the view thus obtained of his favourite golf course was better than he had ever had before. Mr. Rawson also converted many to the "Autogiro," with his convincing proofs of its ability to land vertically. Others who gave displays were Flt. Lt. Clarkson, in the Comper "Swift" and a "Moth"; Capt. Baker, who flew "crazily" all over the aerodrome; Flt. Lt. Russell, who demonstrated the exceptional ability the "Redwing" has for taking off with almost no run at all; and Mr. Percival, who showed off the paces of the "Spartan Mailplane." A formation of two "Avians" and a "Moth" gave a very pretty little exhibition, and both Mr. Ledlie and Mr. Page helped the visitors to take the air in a "Desoutter" and "Puss Moth" respectively.

We should like to add our own congratulations to Henlys upon the success of the visit.

BRITISH AIRCRAFT AT THE ATHENS AERO EXHIBITION

TWENTY-TWO British firms—manufacturers of aircraft, aero engines and accessory equipment—have combined to form a comprehensive exhibit in the First International Aero Exhibition, to be held at the Zappion Palace, Athens, from April 1 to May 1. The Exhibition, which is under the patronage of the Greek Government, is primarily intended for the education of the Greek public. The exhibits, therefore, consist almost entirely of models and photographs of aeroplanes and aero engines, and of specimens of certain smaller component parts and of instrumental and other equipment.

With the help of the Air Ministry, which has lent for exhibition 50 models illustrating the British contribution to aeronautical progress from 1809 up to the present day, the British aircraft industry has prepared a display which may fairly rank as the most informative exhibit ever staged outside this country. Housed in two of the larger and more important rooms in the Zappion, the British section will cover altogether approximately 6,850 sq. ft. of floor area.

No pains have been spared in the planning and building of the various stands. Exact, beautifully constructed scale models, worth anything up to £50 apiece, have been carefully crated and sent to Athens. Special stands have been designed and constructed, and the arrangement is such that it will be possible for any visitor to the Exhibition to gain a clear idea of British aerial history and the present state of progress reached by the industry.

Models now on the way to Athens range from the curious but strikingly prophetic machines projected early last century by Sir George Cayley to some of the latest types of single-seater fighters and big multi-engined air transport machines. All kinds of military machines—fighters, night and day bombers, reconnaissance craft, flying boats and seaplanes—are depicted in photographs and models, side by side with the latest type of large passenger-carrying machines and light aeroplanes. Each in its class is a magnificent example of the skill in design and excellence in construction that have gained for the British aircraft industry the predominant place in world trade; in particular, the later types of military machines depicted are far ahead in performance and general efficiency of all similar craft built in any other country.

Certain of the engines exhibited are sectioned to reveal the internal construction, and several ingenious models showing aircraft in flight and the operation of important components such as magnetos are also being sent for exhibition.

Eight aircraft constructors and three aero-engine builders are included among the exhibitors. Nine manufacturers of accessory equipment are sending specimens of components and materials which will give the layman an idea of the many ramifications of aircraft manufacture. Specimens of aeroplane "dope," wheels, wheel brakes, aero-engine plugs, dinghies for use with seaplanes, oxygen breathing apparatus, wading suits, instrument test chambers, safety harness and belts, and examples of the many navigational instruments used in flying are included in the displays prepared by accessory manufacturers.

Finally, two important users of aircraft, one a leading survey company and the other Imperial Airways, will show respectively aerial photographs, maps and plans that reveal the accuracy and informative value of aerial survey, and models of the large air line machines which assure the services between London, India and South Africa.

The various exhibits in this section will be as follows:—

Aircraft

Air Ministry: Historical collection of British flying machines from 1809 to 1932.

Sir W. G. Armstrong Whitworth Aircraft, Ltd.: A.W. XVI single-seater fighter; "Atlas" Mk. II two-seater military biplane; A.W. XV four-engined monoplane.

Blackburn Aeroplane & Motor Co., Ltd.: First Blackburn-built aeroplane (1909); "Bluebird IV" light biplane; "Lincock" single-seater fighter; "Segrave" touring monoplane; reconnaissance bomber; "Sydney" military flying boat.

Bristol Aeroplane Co., Ltd.: "Bulldog" single-seater fighter; "Bristol" "General Purpose" biplanes. Specimens of metal construction.

Fairey Aviation Co., Ltd.: Fairey IIF "General Purpose" biplane; "Fox IIM" two-seater fighter; "Firefly IIM" single-seater interceptor fighter.

H. G. Hawker Engineering Co., Ltd.: "Fury" single-seater interceptor fighter; "Hart" day bomber; "Audax" Army Co-operation biplane; "Nimrod" Fleet single-seater fighter; and other Hawker military aircraft.

Saunders-Roe, Ltd.: "Saro Cutty Sark" Amphibian flying boat; "Saro Windhover" flying boat; "Saro Cloud" military flying boat.

Short Bros. (Rochester & Bedford), Ltd.: Flying Boats—"Kent" four-engined air liner; "Calcutta" three-engined air liner; "Singapore I" two-engined and "Singapore II" four-engined patrol and reconnaissance machines; "Rangoon" three-engined military boat. *Float Seaplanes*—"Valetta" three-engined float seaplane; "Gurnard" two-seater fighter. Specimen floats for seaplanes.

Spartan Aircraft, Ltd.: "Spartan Arrow" light aeroplane; three-seater light aeroplane; three-engined mail carrier.

Engines

Armstrong Siddeley Motors, Ltd.: Air-cooled radial engines—800-h.p. "Leopard"; 535-h.p. "Jaguar Major"; 340-h.p. "Double Mongoose"; 215-h.p. "Lynx"; 140-h.p. "Genet Major."

D. Napier & Son, Ltd.: "Lion" 450-h.p. Series V water-cooled aero engine (sectioned).

Rolls-Royce, Ltd.: "Kestrel" 480-h.p. water-cooled aero engine (sectioned).

Accessories

British Thomson-Houston Co., Ltd.: Five aero-engine magnetos. Demonstration working model.

Callender's Cable & Construction Co., Ltd.: Specimens of insulated cables for aircraft. Working model of aeroplanes in flight.

Cellon, Ltd.: Frames and panels coated with "Cellon." Pictures of aircraft doped or varnished with "Cellon."

Dunlop Rubber Co., Ltd.: Aeroplane wheels, tyres (including wheel-less tyres).

Lodge Plugs, Ltd.: Painting of Schneider Trophy racer. Specimens of aero-engine plugs.

Palmer Tyre, Ltd.: Aeroplane wheels, tyres and wheel brakes. Brake equipment.

Rubery Owen & Co.: Aircraft small metal parts and accessories.

Siebe Gorman & Co., Ltd.: Seaplane dinghies. Oxygen breathing apparatus. Airspeed calibrators. Wading suits. Fire extinguishers. Flexible connections and drives. Instrument test chambers. Inflatable life-belts. Safety harness and belts. Cockpit paddings.

Smith's Aircraft Instruments: Comprehensive collection of aircraft instruments for navigation, piloting and engine operation.

Air Survey Co., Ltd.: Aerial photographs, maps and plans.

Imperial Airways, Ltd.: "Hannibal" 40-seater air liner; "Scipio" four-engined flying boat; "Atalanta" monoplane air liner.



Windermere Flying Banned

WINDERMERE Urban Council have refused an application from F/O. R. C. H. Monk for a passenger-carrying flying-boat to alight on the lake and discharge visitors to the district, and to provide joyrides with a five-seater

amphibian. Councillor Ion opposed the application, and said Windermere was not a suitable place for flying-boats to alight on, especially in the season, when the water was congested with pleasure boats, and the Council, as guardians of the lake, had to protect the public.

AIR ESTIMATES

THE Air Estimates for the year 1932* were issued on March 3 and show a net decrease of £700,000 as compared with last year's estimates. The gross estimate is £19,702,700, but appropriations in aid are expected to amount to £2,302,700, thus reducing the total for effective and non-effective services to £17,400,000.

The following table† shows the net amounts required under the various votes, and we have added the figures for the last five years.

| Vote | NET ESTIMATES | | | | | |
|---|---------------|------------|------------|------------|------------|------------|
| | 1932 | 1931 | 1930 | 1929 | 1928 | 1927-28 |
| 1 Pay, etc., of the Air Force | 3,930,000 | 3,907,000 | 3,731,000 | 3,323,000 | 3,401,000 | 3,160,000 |
| 2 Quarters, stores (except technical supplies and transport) | 1,590,000 | 1,721,000 | 1,735,000 | 1,676,000 | 1,711,000 | 1,365,000 |
| 3 Technical and warlike stores (including experimental and research services) | 7,350,000 | 7,672,000 | 7,596,000 | 6,585,000 | 6,567,000 | 6,424,000 |
| 4 Works, buildings and lands | 1,650,000 | 1,790,000 | 1,720,000 | 1,700,000 | 1,700,000 | 1,900,000 |
| 5 Medical services | 295,000 | 302,000 | 298,000 | 306,000 | 310,000 | 203,000 |
| 6 Educational services | 423,000 | 484,000 | 493,000 | 498,000 | 504,000 | 507,000 |
| 7 Auxiliary and Reserve Forces | 516,000 | 599,000 | 591,000 | 556,000 | 554,000 | 500,000 |
| 8 Civil Aviation | 473,000 | 470,000 | 500,000 | 450,000 | 415,000 | 464,000 |
| 9 Meteorological and miscellaneous effective services | 242,000 | 245,000 | 245,000 | 228,000 | 223,000 | 150,000 |
| 10 Air Ministry | 645,000 | 656,000 | 675,000 | 661,000 | 657,000 | 687,000 |
| Total effective services | 17,114,000 | 17,846,000 | 17,584,000 | 15,983,000 | 16,042,000 | 15,363,000 |
| 11 Non-effective services (half-pay, pensions and other non-effective services) | 286,000 | 254,000 | 266,000 | 217,000 | 208,000 | 190,000 |
| Total effective and non-effective services | 17,400,000 | 18,100,000 | 17,850,000 | 16,200,000 | 16,250,000 | 15,550,000 |

Personnel

The numbers of personnel to be borne on the establishment of the R.A.F., or attached thereto, exclusive of India, but including Aden:—*Air Officers*: Total, 38 (same as last year). *Other Commissioned Officers*: 3,200 (same as last year). *Cadets*: 140 (an increase of 10). *Warrant Officers*: 512 (an increase of 12). *Non-commissioned Officers*: 5,900 (an increase of 400). *Aircraftmen*: 19,440 (an increase of 8). *Apprentices*: 2,770 (a decrease of 430). Number to be voted: 32,000 (including Army personnel attached to the R.A.F.) (same total as last year).

Financial Expenditure

Vote 1.—Estimate of the sum required for pay, etc., of the R.A.F.:—Pay and personal allowances of officers, £1,212,000; pay and personal allowances of airmen, £2,250,000; marriage allowance, £118,000; miscellaneous allowances and payments, £27,500; civilians, £918,500; service gratuities to airmen on discharge, etc., £16,500; recruiting staff and expenses, £7,500. Gross total, £4,550,000. Appropriations in aid, £620,000. Net total, £3,930,000. Net increase, £23,000.

Vote 2.—Accommodation allowances, £180,000; barrack services, £61,000; fuel and light, £236,000; general stores, £114,000; clothing, £232,000; provisions and horses, £509,000; transport, £372,000. Gross total, £1,704,000. Appropriations in aid, £114,000. Net total, £1,590,000. Net decrease, £131,000.

Vote 3.—*Technical and warlike stores* provide for the following amounts:—Aeroplanes, seaplanes, engines and spares, £5,738,000; experimental and research establishments, £154,000; inspection services, £177,000; aircraft technical and warlike stores, £160,000; armament and ammunition, £432,000; electrical stores, £284,000; miscellaneous research and development, £262,000; miscellaneous materials, £198,000; balloons and hangars, £7,000; mechanical and other transport, £223,000; petrol and oil, £788,000; rewards to inventors and miscellaneous claims (including war liabilities), £30,000; airship development, £16,000. Gross total, £8,469,000. Appropriations in aid, £1,119,000. Net total, £7,350,000. Net decrease, £322,000.

Vote 4.—*Works, buildings and lands* shows the following figures:—Staff for works services, £217,500; new works, additions and alterations, amounting to £2,500 each and upwards, £876,000; new works, additions and alterations, under £2,500 each, £105,000; ordinary repairs, renewals and maintenance, £475,000; grants towards the cost of works, £8,000; purchases of lands and buildings, £45,000; rents, compensations and reinstatements, £28,500; incidental expenses of Air Ministry estates, £10,500; provision of telephone and telegraph services, £500; miscellaneous works services, £8,000; stores and plant for works, £17,000; machine tools, £40,500. Gross total, £1,831,500. Appropriations in aid, £181,500. Net total, £1,650,000. Net decrease, £140,000.

Vote 5.—*Medical Services.*—Pay and personal allowances of officers, £130,000; pay and personal allowances of airmen, £87,000; nursing service, £21,000; fees, etc., to civilian medical practitioners, £11,000; civilians employed in hospitals and sick quarters, £18,000; medical stores and supplies, £15,000; payments to hospitals, £26,000; miscellaneous charges, £2,000. Gross total, £310,000. Appropriations in aid, £15,000. Net total, £295,000. Net decrease, £7,000.

Vote 6. *Educational Services.*—Imperial Defence Col-

lege, pay and allowances and contribution towards general expenditure, £4,300; R.A.F. Staff College, Andover, salaries, wages and contingencies, £13,700; R.A.F. College and Electrical and Wireless School, Cranwell, salaries, wages and contingencies, £133,000; School of Technical Training (Apprentices), Halton, salaries, wages and contingencies, £192,000; School of Technical Training (Men), Manston, salaries, wages and contingencies, £25,000; School of Physical Training, Uxbridge, salaries and wages, £3,100; School of Store Accounting and Storekeeping, Kidbrooke, salaries and wages, £3,100; general educational services, £50,000; miscellaneous educational charges, £8,800. Gross total, £433,000. Appropriations in aid, £10,000. Net total, £423,000. Net decrease, £61,000.

Vote 7. *Auxiliary and Reserve Forces.*—R.A.F. Reserve: (a) Pay and personal allowances of permanent staff, £3,400; (b) pay and personal allowances during training, £15,200; (c) retaining fees and reserve pay, £134,500; (d) payments to civil companies for training courses, £169,000; (e) miscellaneous expenses, £1,700. Special Reserve and Auxiliary Air Force (f) Pay and personal allowances of H.Q. staff, £11,600. Special Reserve: (g) Pay and personal allowances of regular personnel, £81,000; (h) training, £4,000; (j) miscellaneous expenses, £1,100. Auxiliary Air Force: (k) Pay and personal allowances of regular staff, £57,500; (l) grants to county associations, £21,300; (m) training, £8,500; (n) miscellaneous expenses, £2,500. University Air Squadrons: (o) Pay and personal allowances of instructors, etc., £3,800; (p) miscellaneous expenses, £900. Voluntary Air Detachments, £200. Gross total, £516,200. Appropriations in aid, £200. Net total, £516,000. Net decrease, £83,000.

Vote 8. *Civil Aviation.*—Civil aviation aerodromes, £33,000; air routes, surveys, etc., £22,000; technical equipment, £13,000; works, buildings and lands, £35,000; miscellaneous, £2,000; civil aviation subsidies and grants, £561,000. Gross total, £666,000. Appropriations in aid, £193,000. Net total, £473,000. Net increase, £3,000.

Vote 9. *Meteorological and Miscellaneous Effective Services.*—Meteorological services: (a) Salaries and allowances of the Meteorological Office, £51,000; (b) salaries, wages and allowances of staff at meteorological stations, £62,500; (c) fuel, light and transport, £4,500; (d) instruments, equipment, stores and research, £10,000; (dd) grant in aid of Polar research, £4,000; (e) works services, £6,000; (f) telegraph, telephone and miscellaneous charges, £18,000; (g) superannuation, £2,000. Miscellaneous effective services: (j) Compensation for losses, etc., £12,000; (k) losses by exchange, etc., £300; (l) payments to the War Office in respect of prison services, £1,500; (m) telegraph and telephone charges, postage abroad, £64,700; (n) miscellaneous, £23,000; (o) allowances to ministers of religion, £7,500. Gross total, £267,000. Appropriations in aid, £25,000. Net total, £242,000. Net decrease, £3,000.

Vote 10. *Air Ministry.*—Salaries and allowances of the

* Printed and published by H.M. Stationery Office. Price 3s. 6d. net.
† This table gives Estimates, not corrected by supplementary Estimates or under-spending.

Air Council and Department of the Secretary, £301,500; salaries and allowances of the Department of the Chief of the Air Staff, £111,500; salaries and allowances of the Department of the Air Member for Personnel, £46,200; salaries and allowances of the Department of the Air Member for Supply and Research, £144,000; salaries and allowances of the Directorate of Civil Aviation and the Accidents Branch, £21,300; pay of messengers, cleaners, etc., £22,600; contingent expenses, £900. Gross total, £648,000. Appropriations in aid, £3,000. Net total, £645,000. Net decrease, £11,000.

Vote 11. *Half-pay Pensions and Other Non-effective Services*.—Rewards to officers, warrant officers, non-commissioned officers and aircraftmen, £350; half-pay of

officers, £7,000; service and disability retired pay and gratuities of officers and nurses, £164,000; wound pensions, officers, £530; service and disability pensions and gratuities, warrant officers, non-commissioned officers and aircraftmen, £61,800; pensions, gratuities and allowances to widows, children, etc., of deceased officers and airmen, £25,500; civil non-effective payments, recurrent charges, £9,700; civil non-effective payments, gratuities and other non-recurrent charges, £7,900; injury grants, £8,720; commutation of retired pay, wound pensions, etc., £21,800; relief fund, £500; miscellaneous non-effective payments, £200. Gross total, £308,000. Appropriations in aid, £22,000. Net total, £286,000. Net increase, £32,000.

MEMORANDUM BY THE SECRETARY OF STATE FOR AIR

AS in previous years, the Air Estimates are accompanied by a Memorandum by the Secretary of State. This reads as follows:—

Air Estimates for 1932, at a net figure of £17,400,000, show a decline of £700,000 on those for the current year. Appropriations in Aid are, however, down by nearly £800,000 (mainly on Vote 3—Technical and Warlike Stores), so that the gross total is some £1,500,000 lower at £19,702,700.

The decline is the direct and inevitable result of the current financial crisis; and, whilst a number of economies of a permanent character have been effected, it has only been possible to achieve so large a reduction by the postponement of many services, which, under normal conditions, would be regarded as essential, and by makeshift expedients which cannot be repeated. There has been no option but to sacrifice a number of important items in the programme, but effort has been concentrated on producing the results demanded of the Royal Air Force by the nation's necessities with the minimum loss of efficiency. In particular, no action has been or will be taken which might in any way adversely affect the safety of flying personnel. In pursuance of this general policy, a particularly large proportionate reduction has been made in the Vote for Works and Buildings, though the replacement of uneconomical and unsatisfactory war-time accommodation at certain stations is long overdue.

Further explanations will be found below beneath the several Vote headings. The only special feature to which it is necessary to draw attention is the final disappearance of any reference to the "super-cut," following on a recommendation of the Public Accounts Committee. The "super-cut" on Vote 3 (Technical and Warlike Stores) had already been eliminated last year; in the case of Vote 4 (Works and Buildings) it has this year been replaced by a suitable provision for anticipated delays in the execution of major contracts, to an amount agreed with the Treasury, but not shown, as heretofore, on the face of Estimates. For the rest, there are decreases totalling £758,000 on all Votes except 1, 8 and 11, on which there are small increases amounting in all to £58,000, thus giving the net reduction of £700,000 above mentioned.

The table below gives the customary summarised comparison with the corresponding figures for 1931:—

| | 1932. | 1931. | + or - |
|--|-------------|-------------|-------------|
| Gross Estimate | £19,702,700 | £21,197,200 | - 1,494,500 |
| Deduct Fleet Air Arm grant .. | 1,025,000 | 1,126,000 | - 101,000 |
| Deduct other Appropriations in aid | 1,277,700 | 1,971,200 | - 693,500 |
| Net Estimate | 17,400,000 | 18,100,000 | - 700,000 |

Disarmament

His Majesty's Government having subscribed to the Armaments Truce, no new units are being formed in 1932. In the normal course a minimum of two new Home Defence Squadrons would have been added under the programme initiated in 1923, but subsequently three times retarded, with the result that ten regular squadrons still remain to be formed for its completion. Meantime, despite general recognition of the growing dependence of the British Empire on air power as on sea power, the serious disparity between the first-line strength of the Royal Air Force and foreign air services remains as tangible evidence of

the efforts made by this country ever since the war to further the cause of disarmament, alike by precept and practical example. His Majesty's Government would view the situation with anxiety, but for their earnest hope and expectation that the Disarmament Conference now in session at Geneva will bring about a reduction in air armaments.

Strength and Distribution of the Royal Air Force

The increases in the strength of the Royal Air Force foreshadowed in last year's memorandum, viz., three new regular squadrons for Home Defence and one additional flight for the Fleet Air Arm, have been duly implemented. As a result, the present total strength of the Royal Air Force is 75½ regular squadrons, including the equivalent of 13½ squadrons in the Fleet Air Arm.

The Home Defence Force now comprises 42 of the 52 squadrons envisaged in the 1923 programme, and of these 13 are non-regular—8 auxiliary and 5 cadre. The decision not to proceed with the formation of any new units in 1932 entails a further retardation of this programme for the fourth time since its original initiation.

The distribution of units as between Home and Overseas remains unchanged.

Operational and other Activities

(1) *Overseas*.—The only operations of importance in which the Royal Air Force was called upon to take part during the past twelve months were in Northern Iraq. As a result, the Iraq Army, acting in co-operation with the Royal Air Force, secured the surrender of a Sheikh whose turbulent activities had long been a focus of unrest in Kurdistan. Small scale action was also taken on the North-West Frontier of India and at Aden. The normal activities of reconnaissance and communication were, however, fully maintained, and the returns received from the several Air Commands show an actual increase in flying hours as compared with 1930. The constant vigil maintained year in and year out by the squadrons on the North-West Frontier of India and in other overseas theatres such as Iraq, Trans-Jordan and Aden calls for a large volume of flying over the mountainous or desert terrain and under arduous climatic and other conditions. An interesting episode during the year was the participation of the Royal Air Force in the measures to deal with the disturbances which broke out in Cyprus in October. Seven aircraft of No. 216 (Bomber-Transport) Squadron were employed for the conveyance overseas at short notice of a body of reinforcing troops (126 officers and men in all, in addition to 30 personnel of the Royal Air Force) by air from Cairo to Nicosia and four aircraft from No. 45 Squadron were also flown to Cyprus and carried out a series of flights on patrol or reconnaissance.

Earlier in the year aircraft of No. 36 Squadron were flown from Singapore for similar duties over rebel areas in Burma.

Some useful survey work has been carried out in Trans-Jordan, where an area of the Jordan Valley, the mapping of which was urgently required for the Colonial Office, was photographed, and the War Office were thus enabled to produce maps, the making of which would otherwise have entailed a lengthy and troublesome ground survey. It is proposed in 1932 to make similar use of aircraft to implement the arrangements which have lately been agreed between the British and Ethiopian Governments for the delimitation of the frontier between Abyssinia and Somaliland.

(2) *Home*.—By achieving in September their third successive victory since 1927, the Royal Air Force won outright for Great Britain the much-coveted Schneider Trophy. The average speed of the winning aircraft on three circuits of a course of 217 land miles was 340 m.p.h. This represents an increase of over 11 m.p.h. on the speed achieved in 1929. The very striking advance in the performance alike of machines and engines during the past decade is noteworthy; in 1921 the average speed of the winning machine was under 111 m.p.h.

Subsequently an aircraft and engine of similar design (also flown by a Royal Air Force pilot) achieved the world's speed record of 407.5 m.p.h., exceeding the previous record of 1929 by nearly 50 m.p.h. In the matter of organisation and mastery of the complex and constantly changing problems of aeronautical technique, British air prestige has for long been second to none. These striking successes, due to the closest co-operation between the Royal Air Force High-Speed Flight, the technical departments of the Air Ministry and the aircraft and engine manufacturing industries, have raised it still higher, as is evidenced by the demand for British products the world over. Without the munificence of a private donor, they could not have been achieved, and a special tribute is due to her generosity and public spirit.

Air exercises were successfully carried out in July. A total of nearly 300 aircraft were engaged and approximately 2,000 hours' flying was done, both by day and night, in the 2½ days during which operations lasted.

Despite much bad weather, there were no serious incidents of any description.

Air Routes and Long-Distance Flights

The flight from Cairo to the Cape and back in the early months of 1931 was brought to a successful conclusion in scheduled time, despite the severe climatic conditions experienced on certain sections. Co-operation with the local forces was provided at Entebbe, Nairobi and Tabora. The route followed on the return journey is now being flown regularly by civil aircraft carrying mails and passengers. Thirteen thousand miles in all were covered during the flight.

In the early part of the year a flight to Egypt was carried out by two flying boats which left Plymouth on March 24; travelling via Hourtin, Berre and Malta, they reached Sollum on April 2. Thence they flew to Lake Timsah on the Suez Canal, and subsequently returned to England via Crete, Athens and Naples, a total distance of 5,500 miles.

A flight of four aircraft left Egypt in October for a cruise to Nigeria and the West African Colonies. On reaching Kano, however, news was received of an outbreak of yellow fever in the Gold Coast and French West Africa, and after efforts had been made to find a practicable alternative route which would avoid the fever-stricken area, the extension of the flight west of Nigeria had to be abandoned. This decision was arrived at with great reluctance, as the original programme would have marked the first occasion on which Sierra Leone (Freetown) and all the British West African colonies had been visited on a single cruise. During the enforced halt at Kano and on the return journey the opportunity was taken to carry out co-operation with troops of the Nigerian Rifles. The total distance flown on the curtailed programme was 5,000 miles.

Another long-distance flight is being carried out by four aircraft from one of the squadrons stationed in Egypt which commenced on January 11 a tour of Kenya, Tanganyika and Uganda; the itinerary will cover some 7,000 miles.

Three flying boats flew from Singapore to Port Blair in South Andaman via Rangoon in December. A short stay was made both at the Andaman and Nicobar Islands, the object being to investigate the route as a possible alternative for flying boats travelling between Calcutta and Singapore. The return flight was made via Sumatra and Penang, the length of the round journey being approximately 3,000 miles.

The mobility of Royal Air Force squadrons throughout the world and their power of mutual reinforcement are being steadily developed by such cruises as the above and by more local flights which nevertheless embrace wide areas. For example, the Flying Boat Squadron based on Basrah has been making regular flights up and down the Persian Gulf to Muscat and beyond; the little-known Hadramaut littoral in the South of the Arabian peninsula

is being gradually explored, and flights are taking place with a view to establishing an air route between Aden and Muscat, which are separated from each other by some 1,350 miles of barren and hitherto seldom-visited coastline; and, in the reverse direction, inter-Command flights between Aden and Egypt by landplanes are at the present time actually in progress.

Personnel and Training

Following on the formation of the new units detailed in an earlier section of this memorandum, Vote 1 (Pay, etc., of the Royal Air Force), would have shown a substantial increase but for countervailing economies which have been effected in a number of directions. As a result of these economies this Vote shows an increase of only £23,000 despite the necessity for providing in 1932 £50,000 for an extra pay day for airmen and civilians paid weekly; and this small increase is much more than offset by decreases amounting to £151,000 in the other personnel Votes (Votes 5, 6 and 7)—making a net total reduction on these Votes of £128,000.

Apart from the reductions in the pay of officers, airmen and civilians recently decided on by His Majesty's Government, substantial savings are anticipated from (i) the introduction of a modified scheme for short service officers, and (ii) the reorganisation of the School of Technical Training for apprentices at Halton.

As regards (i), as from April 1 next officers granted short service commissions in the General Duties Branch will be commissioned as acting pilot officers and will serve for a period of six years on the active list (instead of five years as at present), followed by four years in the reserve. The first year of service will be spent in training in the new sub-rank of Acting Pilot Officer (to which a slightly lower rate of pay is attached) and the revised scheme will accordingly permit of five years' employment in a fighting unit in lieu of four. The Royal Air Force will, therefore, gain in efficiency by the increased experience of the short service officers. Moreover, the additional year's service by each officer will render possible a reduction in the annual intake with a consequent saving in the cost of training; it will also result in individual short service entrants having improved prospects of selection for permanent commissions. Since candidates over 21 years of age will not in future be considered, there should be no increase in the average age (which has, of recent years, been steadily reduced) of short service officers returning to civil life.

As regards (ii), the School of Technical Training at Halton is being reorganised on a basis of two wings (instead of three as at present) in the light of the reduced intake of aircraft apprentices, and substantial economy in instructional staff is thus rendered possible. There will, however, be no lowering of the standard of training given, which it is essential to maintain at its present high level in order to ensure the efficient and safe maintenance of aircraft. As a result of these and other savings Vote 6 (Technical Training and Educational Services) shows at £423,000 a reduction of £61,000 as compared with the current year.

The experiment is being tried of employing a slightly increased proportion of airman pilots as flying instructors in lieu of officer instructors; the scheme will also allow of the selection of instructors from among officers and airman pilots who have somewhat longer flying experience than has been possible in the past and will thus tend to raise still further the already high standard of flying instruction. Airman pilots so selected as instructors will have their normal period of five years' flying service extended to eight years. The combined effect of these changes will be an appreciable saving in officer personnel and consequently in cost, and an improvement also in the career open to airmen.

Further progress has been made with the policy of relieving officers of such technical duties as can properly be performed by airmen, by means of the appointment of warrant officers and senior non-commissioned officers in the place of flying officers as signals and photographic instructors in squadrons.

Reserve and Auxiliary Forces

The net total of Vote 7 is £516,000, a reduction of £83,000 on the current year's figure. The reserve pay of airmen, which was fixed at 1s. a day in 1921, since when the cost of living index figure has fallen by 40 per cent., has been reduced by 25 per cent. to 9d. a day. The strength of the airmen's reserve has also been temporarily

curtailed. These two measures are estimated to produce savings of over £50,000. The balance of £33,000 will accrue mainly from reductions in the amount of voluntary additional flying by Reserve pilots, in the payments to civil companies for flying training, and in the retaining fees payable to officers of the Reserve. These measures of economy are already in operation.

Apart from the minor restriction mentioned above, it has been found possible to secure the necessary economies in expenditure on the reserve and auxiliary forces without too serious curtailment of the normal training programme.

A notable feature of the training of the Cadre (Special Reserve) squadrons during 1931 was the participation, for the first time, and with highly satisfactory results, of two units, viz., No. 502 (Ulster) Squadron and No. 503 (County of Lincoln) Squadron, in night-flying operations during the Air Exercises. Day-bombing squadrons of the Auxiliary Air Force also played an important rôle in these exercises, and showed once again a very high standard of flying and general efficiency. Bomb-dropping practice was seriously handicapped by bad weather during the summer.

During 1931 the number of flying hours completed by the University Air Squadrons at Oxford and Cambridge showed a further increase, chiefly in cross-country flying. Formation flying for the more experienced members was introduced for the first time. The number of Proficiency Certificates gained during the year reached a total of 74. For this certificate a member must, in addition to carrying out a certain number of hours' solo flying, pass an examination in four basic aeronautical subjects. Both squadrons were maintained at full strength throughout the year, and each has a long waiting list of candidates for membership.

Technical Equipment

Vote 3 (Technical and Warlike Stores) shows a net total of £7,350,000, being a decrease of £322,000 on the figure for 1931. There is further a heavy decline in Appropriations in Aid primarily due to reduced provisioning for units in India and the Fleet Air Arm.

This Vote, representing as it does over 40 per cent. of total air expenditure, has inevitably had to make the largest single contribution to the reductions in expenditure necessitated by the financial crisis. The decline in the net figure above mentioned is, however, only 4 per cent., or proportionately much smaller than on other votes, any larger reduction being precluded by considerations of the vital importance of maintaining the technical equipment of the Royal Air Force at the highest possible pitch of efficiency. The rearmament of squadrons has necessarily been curtailed, but fortunately all machines of war-time design were already due to pass finally out of service on completion of the current year's programme, and the Force is already to a large extent equipped with aircraft of types brought into service within the past five years.

Indeed, as a result of the steady progress in rearmament of recent years, it may be said that the era of wooden aircraft has, in so far as the Royal Air Force is concerned, passed into history, and in 1932 its first-line units will be wholly equipped with machines either of all-metal structure or composite of metal and wood. Wood is, indeed, now employed only for the wings and tail units of a very small number of the older types and for certain small components. Experience is showing that aircraft of metal construction undoubtedly have a longer life than those of wood, and, in consequence, considerable economies in maintenance costs are being effected.

The replacement of worn-out mechanical transport is still proceeding, though in the present stringency it has been necessary materially to reduce expenditure under this head in 1932. A considerable measure of replacement has, however, already been effected, and the substitution of newer and more efficient types of vehicle has enabled material reductions to be effected in the total establishment of motor transport which would otherwise have been required. The number of vehicles on charge to-day is, in fact, substantially lower than six years ago, despite the increase in the size of the Force since that date. The fitting of pneumatic tyres to heavy vehicles is another measure which has been found to be productive of economy by increasing their life.

There is again a rise in the amount taken for petrol to meet the higher prices and the larger consumption due to increased flying and the use of more powerful engines.

Research and Technical Development

The total allotted to Research and Technical Development is shown as usual in Appendix I of the Estimates.

At £1,458,000 there is a decline of £116,000 on the current year's figure. As has already been announced, it has been decided, owing to the imperative need for reducing expenditure, not to proceed with the construction of a large civil flying boat, thereby releasing funds for other and more urgent requirements, in particular a fast mail-carrying aircraft. The research and technical programmes have had to be curtailed in a variety of other directions, in order to effect the necessary economies, a process which has, however, been assisted by the completion of certain works at Farnborough.

The Compressed Air Tunnel at the National Physical Laboratory will shortly begin its research programme, and in 1932 the modernisation of one of the existing smaller tunnels at the Laboratory will be put in hand. Construction of the Large Wind Tunnel at the Royal Aircraft Establishment, Farnborough, is also about to begin. A model for this tunnel was constructed in the form of a small 5-ft. tunnel, and this has proved so efficient that a new power plant is being provided which will enable the tunnel to be run at an air speed of 200 m.p.h.—the highest speed of any wind tunnel in the country.

The vertical tunnel, in which the wind is forced upwards instead of horizontally, enables an aircraft model to be set spinning in the rising column of air and its characteristics to be observed. This tunnel is 12 ft. in diameter and provides a most valuable medium for investigating the all-important problems associated with "spinning."

The seaplane testing tank at Farnborough has been erected and, as soon as the adjustment of its carriage and mechanism (which require the greatest possible accuracy) is complete, a full programme of research will be set in train.

The reorganisation and reconstruction of the Royal Aircraft Establishment are now almost complete.

Among interesting developments of the year it may be mentioned that, for the purposes of the Schneider Trophy contest, a water-cooled engine, already of high efficiency and rated at 825 h.p., was developed to give no less than three times that power. Elsewhere the application of superchargers to maintain the horse-power obtained at ground level up to altitudes of eleven or twelve thousand feet has been extended and has entailed a special study of the freezing of carburettors at exceptionally low temperatures. An important series of flying trials at heights up to 15,000 ft. has recently been completed with the special object of ascertaining the best means of obtaining fuel economy. Attention is being devoted to further experiments with compression-ignition engines intended primarily for large aircraft flying over long distances, in which the maximum economy of fuel is essential.

Airships

His Majesty's Government having reluctantly reached the conclusion that the financial crisis necessitated cancellation of the proposed programme for the refitting and operation of the R.100, and the final disposal of that vessel, Cardington and the overseas bases at Ismailia and Karachi have been reduced to care and maintenance parties. A small nucleus staff is being retained at the Royal Airship Works to keep abreast of technical developments in other countries and to continue with a modest programme of research and experiment.

The provision of £16,000 in these Estimates covers the cost of the maintenance parties at Cardington, Ismailia and Karachi, and of the small technical section above mentioned. Buildings, machinery and plant are being kept in such a condition that they can readily be made available for use if required, either for our own purposes or for the reception of visiting airships from abroad.

Works

The net total of Vote 4 at £1,650,000 is £140,000 below that for 1931, a reduction of approximately 8 per cent.

In view of the financial stringency, the new services proposed are confined to urgently required improvements in the accommodation of certain existing units, many of which are still housed in temporary buildings quite unsuitable for permanent occupation. Provision is made for the replacement of such buildings at a number of Home Stations; and for the construction of suitable accommodation for units of the Fleet Air Arm at Hong Kong, which have since 1927 occupied very unsatisfactory quarters improvised during the emergency of that year.

Expenditure on works services in Iraq, Palestine and Trans-Jordan, which is repayable from the Vote for

Colonial and Middle Eastern Services, has been reduced by £58,250.

Civil Aviation

The gross total of Vote 8 (Civil Aviation) is £666,000, which includes a sum of £166,000 repayable by the Government of the Union of South Africa and other African Administrations in respect of the Air Service from Cairo to the Cape. The net total of this Vote is £473,000, an increase of £3,000 on last year's figure. Contractual subsidy payments to Imperial Airways in respect of their European, Indian and African Air Services will amount in 1932 to £541,000, from which the above-mentioned figure of £166,000 must be deducted, leaving a net sum to be voted under this head of £375,000.

The first machine on the through service between Cairo and Cape Town left Cairo on January 24, and the whole service is now in regular operation in extension of the previous preliminary service to Mwanza (Tanganyika). In the case of the route to India, the permission accorded by the Persian Government to Imperial Airways to fly along the Persian Coast expires on March 31. Its renewal is still under discussion with the Persian Government, and in the meantime preparations are in train for the use of an alternative route, if required. Provision has been taken for the ground organisation and other additional expenditure which will be necessary, if this alternative route is brought into operation.

The major project, referred to in last year's memorandum, for the extension of the Indian Service to Australia, has again had to be postponed owing to the economic difficulties in this country and in Australia.

As a result of arrangements with the Manchester Corporation, who will erect the buildings and pay a small charge, provision has been made to equip a Wireless and Meteorological Station at Manchester to serve the needs of civil aviation in the North of England.

A small amount has been included for further urgent work on the surface of the London (Croydon) Air Port and for improving the lighting arrangements at that aerodrome and along the air route to the Continent.

Meteorology

Despite the developments dealt with below, the estimated expenditure on Meteorology (Vote 9) during 1932, shows a net reduction of £1,000. The gross figure at £158,000 is £2,000 lower.

The civilianisation of the meteorological service in Iraq, the cost of which is in consequence transferred to this Vote from Vote 1, will be completed in 1932, and a full year's provision is included (£5,000). The consequent increase in the salary subheads is, however, partially set off by a saving of £4,000, to be obtained by discontinuing the separate organisation for Airship Meteorology.

Expenditure on instruments and equipment will be reduced to £9,000, showing a reduction of £2,000, but receipts from the sale of instruments are also expected to be lower, so that the net saving under this subhead will be £1,000.

Normal research items will be restricted to £1,000, but a special provision of £4,000 is included for research in meteorology and magnetism in Polar regions. This expenditure will take the form of a grant-in-aid to the Royal Society and the Royal Society of Edinburgh, and is part of the international programme for the Second Polar Year, the object of which is to repeat and extend the meteorological and magnetic survey which was carried out by international co-operation in 1882-3. A party of British meteorologists is to be sent to Fort Rae in Canada, where a British station was maintained during the First Polar Year fifty years ago.

Building and renovation at meteorological stations are being restricted as far as possible, and expenditure on works services is reduced by £2,000.

A variety of minor economies are being effected under other heads.

Air Ministry

Vote 10 (Air Ministry) is again reduced, and is lower than last year by £11,000.

The saving is in the main due to the effect of the reductions in civilian salaries and in the pay of officers of the Royal Air Force decided upon last autumn, which more than offset automatic increases under incremental scales. In addition, as a result of a continuous review of staff in all departments, certain minor economies have been effected, despite the steady growth in the strength and activities of the Royal Air Force and the continuous development of Civil Aviation.

LONDONDERRY.

AIR MINISTRY,
February 25, 1932.

GORDON ENGLAND ON GLIDING

ON Wednesday, March 2, before the Royal Society of Arts, Mr. Gordon England delivered a lecture on "Soaring Flight: its Function in Aviation." The paper which Mr. Gordon England read was so comprehensive in its scope and so thorough in its detail that it would be quite beyond the space we have available to report it in full. He started by referring to the early work of the Wright Brothers, and submitted that both they and many other early pioneers did wrong to forsake their gliders at an early stage in their investigations, and suggested that had they continued their experiments we should have, by now, known a very great deal more about the air and how to use it than we do. Mr. Gordon England examined the position as regards gliding to-day, touching on the progress which has been made in Germany and France as well as in England. He then described the chief methods of instruction with their advantages and drawbacks, turning afterwards to scientific and technical development. He enlarged upon Herr Kronfelds' remarkable performance in gliding from Hanworth to Chatham and back again, and stressed his own predilection for the

tailless type of aircraft such as Herr Lippisch produced at the Wasserkuppe. Touching on the meteorological side, the lecturer said that in his opinion this was of the greatest importance to aviation, and there was no doubt that the sailplane offered a ready means of studying meteorological conditions, particularly with regard to thermic currents, their disposition and magnitude. In conclusion, he summarised the work of the British Gliding Association, and described the methods by which it, in so far as it was able, ensured the safety both of the aircraft and of their users. Col. the Master of Sempill was in the chair, and following the discussion, in which Maj. Petre, Capt. Needham, Sqd. Ldr. T. England, Messrs. Griffiths Brewer, Culver and Lowe Wyld took part, there was a film exhibition. One of these was a record of a British party's visit to the Wasserkuppe, and was taken jointly by Mr. Ashwell Cooke and Mr. Hiscox. The other showed some of the activities of the Scarborough Gliding Club in the Yorkshire district. Both were excellent, and together with the slides shown during the lecture gave the audience a very clear idea of gliding and the handling of sailplanes.

At St. James's Palace

HIS MAJESTY THE KING held a Levée on March 8 at St. James's Palace, at which the following were amongst those present:—

Air Marshal Sir E. Ellington, Principal Air Aide-de-Camp; Group Capt. F. K. Haskins, Aide-de-Camp in Waiting; Lt. de Vaisseau A. Sala, French Air Attaché; Lt. Col. P. F. Bitossi, Italian Air Attaché. The following were amongst those presented to H.M. the King:—Flt. Lt. T. Abraham; Chaplain the Rev. J. Appleyard; Wing Com. L. Bailey, A.F.C.; Sqd. Ldr. H. Bowen, M.B.E.; Sqd. Ldr. H. Brown; Sqd. Ldr. W. Bryant, M.B.E.; Sqd. Ldr. A. Collier; Flt. Lt. I. Cozens; Lt. P. de Havilland; Flt. Lt. F. Denny; Sqd. Ldr. J. Duminy;

F/O. E. Edwards; Flt. Lt. E. George; Group Capt. F. Haskins, D.S.C., A.D.C.; Flt. Lt. L. Hyder; F/O. M. Jenks; Flt. Lt. H. Jolleff; Air Vice-Marshal N. MacEwen, C.M.G., D.S.O.; Flt. Lt. F. Nuttall; Wing Com. A. Orlebar, A.F.C.; Sqd. Ldr. A. Paxton, D.F.C.; F/O. N. Pearce; Sqd. Ldr. H. Murray-Philipson, A.A.F.; Flt. Lt. A. Rogers, A.F.C.; Flt. Lt. F. Rowland; Flt. Lt. C. Rugg; Sqd. Ldr. V. Scriven, A.F.C.; Flt. Lt. H. Southey; Sqd. Ldr. C. Spackman, D.F.C.; Sqd. Ldr. W. Swan; Flt. Lt. C. Toogood; Flt. Lt. T. Traill, D.F.C.; Marshal of the R.A.F. the Lord Trenchard, G.C.B., D.S.O.; Sqd. Ldr. C. Turner, A.F.C.; Sqd. Ldr. S. Vincent, A.F.C.; Sqd. Ldr. H. Wigglesworth, D.S.C.; Sqd. Ldr. J. Woodhouse, D.S.O., M.C., etc.

Private Flying & Gliding

THE LONDON AEROPLANE CLUB

A very satisfactory flying time is recorded for the month of February, 133 hr. flying being put in despite adverse weather conditions.

On the evening of March 5 a strong muster gathered at an informal dance to welcome Mr. Gordon Store, who has lately returned from Africa. Gaiety was the order of the day, and during the course of the evening Mr. D. T. Bennett very kindly treated us to half an hour's conjuring. The finale, when he emerged unharmed but breathless from the telephone booth where he had been placed bound and padlocked in a sack, was received with enthusiasm. We take the opportunity of reminding members that the last of the dances in this series will be held on Easter Saturday, March 26.

It has been suggested that a fencing class be formed amongst the members and instruction given during the evenings. It is proposed to commence as soon as ten members have joined. Will anybody interested in this art please give their names to the Assistant Secretary, Mr. M. P. S. Spencer.

THE LEICESTER AERO CLUB DANCES

Some aero clubs seem able to make wonderful successes of all the social functions which they get up, and to do so, moreover, in the face of many great difficulties.

The Leicestershire Aero Club is certainly one of these. At their annual ball, held last Friday, March 4, for example, the King's Hall in the Grand Hotel was filled to capacity, in fact, the Secretary told us that twice the number of tickets could have been sold. Wisely, however, he deemed that the comfort of those present was of paramount importance, and he therefore refused to be bribed into selling more than a number which was considered adequate for the hall. Now the reason for a success like this lies largely in having an organising committee run by a secretary whose personality is proof against any sort of setback or *contretemps*, but he alone cannot carry everything through safely, and he must therefore be backed by helpers who will do what he asks them without quibbling about it and who will put the nett result of their joint labours before their own personal enjoyment of the occasion. Leicester would appear to be particularly fortunate in this respect, and no one who has once seen them at work need ask how many passengers they carry!

Friday night was definitely a most enjoyable affair. Flying visitors were not numerous, those at Desford including Capt. Diamant of the Dominion Motor Spirit Co., in a "Puss Moth" (Gipsy III); Lt. and Mrs. R. Bentley, of the Shell-Mex B.P. concern, also in a "Puss Moth"; and Flt. Lt. N. Comper, flying one of the Comper "Swifts" (Pobjoy) which he produces at Hooton. Mr. Lindsay Everard brought over a large party from Ratcliffe, including Col. the Master of Sempill; Mr. and Mrs. Nigel Norman; Miss Winifred Spooner and Miss M. Graham. Others we saw were Flt. Lt. J. Armour; Miss Pauline Gower, who has recently purchased another "Spartan," and Miss Spicer.

The music was produced by an orchestra called the "Royal Commanders." As modern dance music goes we suppose it was good, but for our own taste we cannot congratulate them on their choice of tunes, or, at least, pieces of which the lack of tune was the most conspicuous feature; however, the dancers seemed to get on excellently and in their own words the floor was "simply awfully marvellous."

A most lavish supper was part of the programme and the long buffet, decorated with the Club colours, was laden with everything one's inner man could desire. Such an abundance did not, however, completely satiate the guests, for in the early hours of the morning copious quantities of bacon and eggs were produced, none of which returned to the kitchen! Spirits were high, and until long past dawn they remained so. . . . can there be a better tribute to the hospitality of the Club?

BROOKLANDS NOTES

Owing to the very high wind during the early part of the week, and local fog for the last two days, flying has

been considerably curtailed, only 30 hr. dual and solo being managed.

Lady Chaytor and Mr. R. T. Richards left Brooklands on Friday afternoon. Lady Chaytor is organising a lecture tour on fashions in Australia. They are flying a standard "Gipsy Moth" fitted with a 15-gall. tank in the front cockpit and a 20-gall. tank aft. The machine is also fitted with a Reid & Sigrist turn indicator.

Mr. Maurice Jackaman has completed his course of instrument flying; he took off under the hood and made a 50-mile triangular course via Maidenhead and Farnborough, he made a perfect turn over the centre of Maidenhead town, but was about a quarter of a mile out at Farnborough.

Mr. H. D. Davis, Managing Director of Brooklands Aviation, and Mr. G. E. Lowdell, Chief Instructor, are spending a well-earned week's rest freezing on the Norfolk Broads in preparation for what promises to be one of the busiest seasons in the history of Brooklands School of Flying.

Arrangements are now well in hand for Brooklands Air Pageant on May 28—and the London-Newcastle Air Race will start from Brooklands on that day.

Mr. R. L. Palmer, late of the de Havilland School of Flying, Hatfield, has been added to the instructional staff at Brooklands.

The Brooklands Race Track was opened on March 5, and anyone wishing to visit the School will be required to fill in their names at the entrance. Those calling on business will not be charged any admission fee.

HANWORTH NOTES

The annual general meeting of the Hanworth Club took place on Saturday, when the Committee presented their report. Mr. M. B. Bramson, Chairman of the Committee, read the report and pointed out that no less than 150 new members had been enrolled since March, 1931. He said that the credit for the busy year which the Club had had was due to Col. the Master of Sempill. The adoption of the report was seconded by Mr. E. Holder and was carried unanimously.

Mr. Bramson then proposed Lord Stonehaven (who was in the chair) as President for 1932. He said that Lord Stonehaven was the unopposed nominee for this position. Lord Stonehaven was elected with acclamation. Lord Stonehaven, in replying, proposed Lady Swaythling and Mr. Griffith Brewer as Vice-Presidents. He remarked that Mr. Griffith Brewer had flown in 1908 and had also flown on the afternoon before the meeting. Both were elected.

The Master of Sempill expressed the thanks of the members for the splendid work done by the Committee, and said that Lady Swaythling was the first lady member of Hanworth. Mr. Bramson, replying for the Committee, said that it would have been impossible for the Committee to have carried on without the assistance and encouragement of the Master of Sempill and Mr. Noel Smith.

Dr. Petit was then proposed and elected Chairman of the Committee, Mr. Bramson retiring under the rules. He said that many things which the Directors of N.F.S. had done had puzzled him, but none so much as their nominating him as Chairman of the Club Committee. Some of the members, he said, were in the habit of turning up very late for meals. He thought that this was unwise, as well as giving a great deal of extra work to the staff. Members might get something indigestible to eat and find themselves laid up in his hands. He also called attention to the necessity of members showing their badges at the gate.

The result of the ballot to fill vacancies on the Committee, which had taken place earlier in the proceedings, was then announced. Messrs. H. G. Hoile, Lessel Hutcheon, and R. H. Allen and Mrs. Whitbread were elected, the other members being Mr. Carpmal (Vice-Chairman), Lt. Com. P. G. T. Rodd, R.N., and Flt. Lt. R. C. Preston (Hon. Sec.).

Lord Stonehaven then said that he had a very pleasant duty to perform—that of accepting on behalf of the members a trophy, exhibited on the mantelpiece, presented by Miss Cumberbatch with a view to improving the breed of

aeroplanes in this country. The regulations governing the award of the trophy were now being framed by the Hanworth Club in conjunction with the Royal Aero Club, and these two bodies could be relied upon to see that the trophy was put to the best possible use. As one associated with flying for many years (he took a pilot's ticket in 1916), he understood how much encouragement meant. During the war, when lives and money were spent without stint, aviation progressed more than it would have in 100 years of peace, but now its progress depended solely upon encouragement, and the best way of encouraging flying was to present to flying people the prospect of excelling in competition with others. Also, this trophy was unique, and he thought that there would be no lack of competitors for the honour of having their names inscribed upon it.

Miss Cumberbatch then presented the trophy, and suggested that aviation was going too fast and too far for the general public. One heard a lot about long-distance flights, but nothing of the man who just went and came back every day without any publicity. It was this aspect of flying which should be brought more before the public. She expressed her gratitude to Mr. Omar Ramsden, who had designed and executed the trophy, and to the Master of Sempill, who had introduced her to flying.

The Master of Sempill pointed out that the trophy was of most original design, and said that the designer had been inspired by a flight at Hanworth. He called upon the designer to say a few words about the trophy. Mr. Ramsden then explained how, when he had made his first flight, the machine had seemed to make tracks in the air and how the design of the trophy represented achievement after difficulties.

Mr. E. C. Gordon England proposed a vote of thanks to Lord Stonehaven and asked him to say something of his experiences of Imperial flying while he was Governor-General of Australia. Lord Stonehaven said that aviation had progressed considerably since Mr. Griffith Brewer had first flown with the Wright brothers, and produced figures showing that Great Britain alone had shown increased figures for commercial aircraft, payload per machine and horsepower per machine during the last year.

He also gave figures showing how the mileage on air routes had increased during the last two years. He said that he had found aircraft an inestimable benefit while in Australia, and that without the assistance of air travel he would never have been able to cover the ground which he had to cover. In some cases he would have had to cover 200 miles in a day by car over bad roads and would have been fit for nothing at the end of it. Thanks to aeroplanes he had been able to cover 2,400 miles in 32 hr. The aeroplane, he said, eliminates the isolation which makes life in the back blocks so trying. Doctors and supplies are always available at short notice, and therefore the man in the back of beyond now takes his wife with him. Canada had opportunity for comparison with her neighbour, the United States of America; no such opportunity existed in Australia, and therefore anything which brought Australia nearer to the mother country was worthy of great encouragement. There were 8,000 miles of air routes in Australia and the services were operated with such regularity that the backwoods people set their watches by the mail aircraft. The country was not the flying paradise that some people seemed to think it was. Visibility was marvellous, it being possible to pick up landmarks 100 miles away, but the rough ground and scrub four feet high made it a very bad country for forced landing.

Australians had a very highly developed air sense; he instanced Hinkler and Kingsford Smith, and paid a tribute to the pluck of Miss Amy Johnson. Station owners, he said, need a machine which can land in a small space. Many of them fly and he knew of one man of 72 who owned a property $1\frac{1}{2}$ times the size of Wales and inspected it by aeroplane. Another great use for aircraft was for survey work, and there was a big field for this in Australia. Lord Stonehaven expressed the opinion that the future progress of aviation in Australia would astonish the world.

Dr. Petit then announced that there would be a dance at Hanworth on March 18, and the proceedings terminated.

AN ALTERATION OF DATE

The Husbands Bosworth meeting, which has already been announced in FLIGHT to take place on Whit Sunday, is being postponed until May 22 in order that it shall not clash with the Skegness meeting.

A MEETING AT COVENTRY

The Coventry Aero Club will be holding their first meeting on Whit Saturday, May 14, for the purpose of raising funds with which to purchase more machines and equipment for their club-house. The Sir W. G. Armstrong Whitworth Aircraft Co. are assisting this club to a considerable extent by placing Whitley Aerodrome at their disposal.

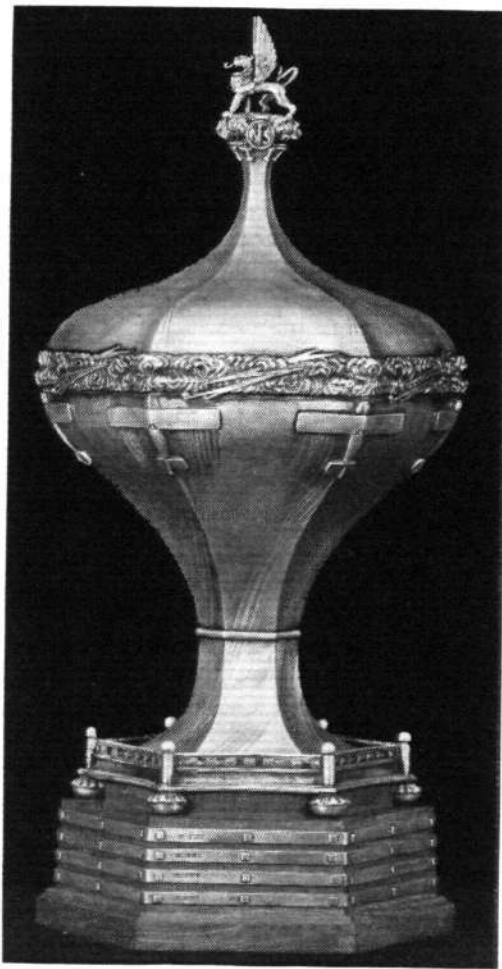
LONDON GLIDING CLUB

During the week ending March 6 a southwesterly breeze blew obliquely up the hill at Dunstable and provided opportunities for a considerable amount of soaring. Amongst those who made excellent flight on Saturday were Stabb, McClement and Dewsbery, all in the "Dagling" with 60, 80 and 90 sec. respectively, the latter completing his "B" licence test on this occasion. Mr. Gibbons came over during the afternoon on his Pobjoy-Klemm and soared very comfortably without his engine. On Sunday Dewsbery soared the "Dagling" for 22½ min., after which he made a voluntary landing, thus obtaining his "C" licence. Lee soared the "Prüfling" for about a quarter of an hour, and later on Grimstone soared the same machine for 19 min. although he has not yet taken out his "A" licence.

Dent had no difficulty in keeping his "Kassel 20" in the air for over half an hour. Our old friend, Marcus Manton, made a long flight in the "Hols-der-Teufel." Others who also flew in this machine were Bolton and Hiscocks. Messrs. Symmonds, Scott-Hall and Smith flew the "Professor" at about 500 ft. for as long as they wished. Mr. H. S. Dixon, the Club's ground engineer, is unfortunately leaving, and his work is being taken on by Mr. Abra. Mr. Dixon established a name for himself when with the Club as always being willing to work and exhibit his exceptional skill and ability in keeping the Club machines in order. It is to be hoped that his new venture will be a success.

BLACKPOOL'S AIR PAGEANT

The Corporation Aerodrome Committee have provisionally decided that Blackpool shall hold an air pageant from June 21-28. This will, of course, be run by National Flying Services at the aerodrome at Stanley Park, and the co-operation of several well-known people, including the Hon. Mrs. Victor Bruce, has been secured. It is probable that this pageant will be held in conjunction with the visit of Sir Alan Cobham. Furthermore, there is a possibility that Mrs. Victor Bruce's endurance attempt, about which much has been said, may take place over Blackpool.



The "Cumberbatch Challenge Cup" for Hanworth Club, given for the encouragement of reliability in flying. It was designed and executed by that well-known craftsman Omar Ramsden, whose house at St. Dunstan's, Seymour Place, S.W.10, is one of the most attractive showrooms imaginable.

Air Transport

CARRIAGE OF AIR MAILS

Director of Civil Aviation on British Policy

COMMENTING at a meeting, held on March 1, of the Royal Empire Society, on the conviction expressed by The Master of Sempill that it was necessary to separate the carriage of mails from the carriage of passengers in order that mails might travel at the speed which the public had a right to expect, the Director of Civil Aviation, Col. Shelmerdine, said:

"I agree entirely that that separation is bound to come. I think it is at least arguable, whether we might not have done better to have started our Empire services as mail services pure and simple instead of combined services for mails, passengers and goods. But I would ask you to remember the object which underlies the subsidisation by Government of a civil air transport, and that object is to get it on a self-supporting basis with as little delay as possible. In order to achieve that object, it seems quite obvious that the operating company must keep its expenses

down and must obtain the greatest possible revenue: and I think that the methods adopted by Imperial Airways in the selection of aircraft and in the conduct of their operations, are the methods most likely to achieve that object which Government has in view. There is no difficulty at all, except possibly a financial difficulty, in getting in this country machines capable of any reasonable speed which may be thought desirable, but it is a question of money and of a great deal of money.

"I would like you to remember that at the present time the United States are subsidising their air mails to the extent of about 3½ million pounds sterling, at the par rate of exchange, per annum. This is an enormous sum, and I would not for one moment say that they in the United States are getting one bit nearer to putting commercial aviation on a self-supporting basis than we are in this country."

FLYING BOATS ON COMMERCIAL AIR ROUTES

PAPER under this title was read on February 29 by Mr. C. H. Jackson, at the City and Guilds (Engineering) College, South Kensington, before the Imperial College Gliding Club, the British Gliding Association, and any others who cared to turn up. The chair was taken by Capt. G. T. R. Hill, of the Westland Aircraft Works.

Mr. Jackson pointed out that at the present time there are only some three or four companies in the world operating large flying boats, and that with the exception of one or two wide stretches of water (Mediterranean and Gulf of Mexico) the flying boat routes are coastwise, and compete with road, rail, shipping and aeroplane transport.

The next part of the paper dealt with operational considerations, such as landing speed, wing and power loading, etc., and was followed by a brief outline of the stages flown by different companies on their various routes.

British, French, German, Italian and American flying boats were described and illustrated, but as most of these will be familiar to readers of FLIGHT it is not thought necessary to give the descriptions here.

Concerning the future of flying boat operation, the lecturer said that along such coasts as the African and American, and from India to Australia, the flying boat would score, because it would save the expense of establishing and maintaining costly aerodromes. As commercial aviation expanded, the amount of night flying would increase tremendously, and on aeroplane routes this would entail the laying out of properly lighted and equipped emergency landing grounds. The flying boat did not require these expensive items of ground organisation. Without even considering very large boats of the DoX

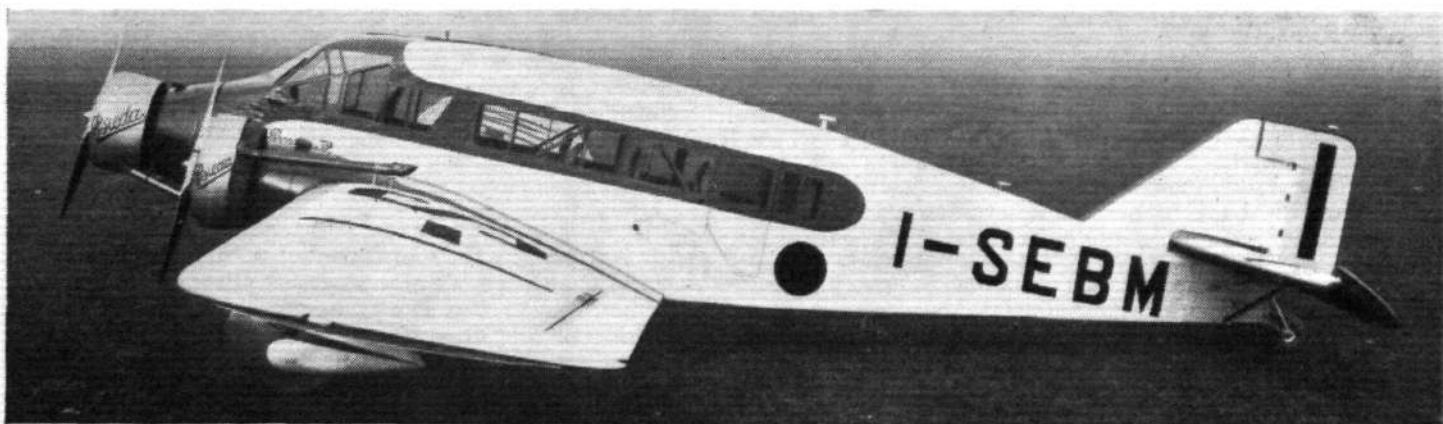
class, the lecturer thought that probably the flying boat would replace aeroplanes on routes such as the coastal African and American, and the longer stages between India and Australia.

The last part of Mr. Jackson's paper dealt with the structural requirements of flying boats, the relative merits of outboard wing tip floats, inboard wing floats, wing stumps, and similar subjects. The shape of planing bottom and its effect on take-off, and the cure for "porpoising" were subjects introduced in simple language. Finally the paper concluded with a description of the forms of flying boat construction in general use, and brief mention was made of the heat treatment of duralumin in the course of flying boat manufacture. Mr. Jackson took as a good example of modern practice the construction of the flying boats designed and built by Short Brothers at Rochester.

The lecture was illustrated by photographs, graphs, etc., projected on the screen, and during the discussion which followed the paper Capt. Hill gave some amusing recollections of his early experience of flying boat work.

A number of R.A.F. officers present took part in the discussion, as did also several members of the technical staff of Short Brothers. The discussion centred mainly around materials used in flying boat construction, the use of M.G.7 alloy (concerning which Mr. Jackson, of Short Brothers, had some interesting experiences to relate), and the cause of sea sickness in flying boats.

Altogether the paper was much appreciated, and did much to give people not previously very familiar with the subject a very good idea of the advantages and problems of this specialised form of aircraft design and operation.



A NEW ITALIAN TRANSPORT PLANE: The Breda 32 three-engined all-metal monoplane. Equipped with 320-h.p. Pratt & Whitney "Wasp Junior" engines, it carries a useful load of 5,940 lb. at a cruising speed of 131 m.p.h. Further details of this machine will be published later.

CANADIAN AIR MAIL SERVICES. FROM OCTOBER 1 TO DECEMBER 31, 1931

| Operator | Route | Pilots | Aircraft | Hours | Miles Flown | Paying Passengers | Express (lb.) | Passenger-Miles | Efficiency, per cent. |
|--|--|--------|----------|--------|-------------|-------------------|---------------|-----------------|-----------------------|
| Canadian Airways, Ltd. Eastern Lines | Toronto—Detroit .. | 2 | 4 | 277 | 28,285 | 19 | — | 2,453 | 80.55 |
| | Rimouski—Montreal .. | 2 | 2 | 48 | 4,930 | 6 | — | 1,392 | 86.03 |
| | Seven Islands—Quebec (started Dec. 15) .. | 1 | 2 | 20 | 2,040 | 1 | — | 93 | 75.00 |
| Canadian Airways, Ltd. Western Lines | Prairie System .. | 12 | 7 | 1,630 | 157,735 | 216 | 55 | 72,297 | 85.94 |
| | Pembina Line .. | 2 | 2 | 117 | 12,302 | 102 | — | 6,772 | 94.56 |
| | Mackenzie River .. | 5 | 5 | 280 | 27,355 | — | — | — | 100.00 |
| | Sioux-Lookout .. | 2 | 2 | 83 | 5,540 | — | — | — | 100.00 |
| National Air Transport | Leamington—Peelee Is. (started Dec. 15) .. | 1 | 1 | 7 | 660 | 15 | 13 | — | 75.00 |
| | Montreal—Albany .. | 3 | 3 | 133 | 13,637 | 63 | — | 12,600 | 86.30 |
| Canadian Colonial Airways, Ltd. General Airways, Ltd. | Amos—Siscoe .. | 1 | 1 | — | 2,394 | — | — | — | 99.00 |
| Total .. | | 31 | 29 | 2,595 | 254,878 | 422 | 68 | 95,607 | — |
| Total for nine months .. | | 38 | 34 | 15,260 | 1,500,265 | 3,784 | 121,713 | 955,110 | — |

Civil Aviation in Canada

IN our issue for January 15 last we published some statistics, issued by the Civil Aviation Branch of the Department of National Defence, Canada, concerning air mail services in the Dominion. We are now able to add to this information with further statistics, set out in the accompanying tables, covering the period October 1 to December 31, 1931.

WEIGHTS OF MAIL CARRIED OVER THE VARIOUS AIR MAIL ROUTES DURING OCTOBER 1—DECEMBER 31.

| | October, lb. | November, lb. | December, lb. |
|--------------------------------|--------------|---------------|---------------|
| Amos—Chibougamau .. | — | — | — |
| Amos—Siscoe .. | 1,316 | 977 | 1,467 |
| Leamington—Peelee Island .. | — | — | 3,427 |
| Monaton—Charlottetown .. | — | — | — |
| Moncton—Magdalen Is. .. | — | — | — |
| Montreal—Albany .. | 960 | 1,000 | 2,874 |
| Toronto—Detroit .. | 2,177 | 1,633 | 1,730 |
| Montreal—Rimouski .. | 5,566 | 3,301 | — |
| Narrow Lake—Sioux Lookout .. | 4,104 | 1,679 | 4,343 |
| Peace River—North Vermilion .. | — | — | 6,411 |
| Quebec—Seven Islands .. | — | — | 2,300 |
| Seven Islands—Anticosti .. | — | — | — |
| Winnipeg—Edmonton .. | 5,590 | 5,159 | 6,540 |
| Winnipeg—Pembina .. | 1,953 | 2,007 | 3,151 |
| Special Flights .. | 92 | — | 28 |
| McKenzie River .. | 3,161 | 3,763 | 6,656 |
| | 24,919 | 19,519 | 38,977 |

The total mail carried during the quarter was 83,415 lb. The total mail carried during 1931 was 483,490 lb., and during 1930 the total was 474,199 lb.

The Proposed Arctic-Atlantic Air Route

FURTHER to the reference in our issue of February 19 last to the proposed Atlantic air mail service via Iceland, it is reported by *The Times* Reykjavik Correspondent that a Bill authorising the Minister of Communications to grant a concession to the Transamerican Air Lines Corporation for the maintenance of a mail and passenger air service from Detroit to Copenhagen via Iceland passed the first reading in Parliament on March 1, and is likely to be made law. By the concession the air line in question would have the sole right to fly over Iceland as far as flights to the United States are concerned, and rights of inland flying over Iceland so long as no other company for this purpose was established. The air line would be allowed to build an airport at Reykjavik and eventually at other

places, and would not be obliged to allow of their use by others; and to establish wireless stations for flying purposes. The concession would be granted for the 75 years, but the monopoly as far as United States flights are concerned only for 15. The rights granted under it could be cancelled if a regular Transatlantic air service were not established at the latest by 1936. For passing the Greenland Icecap the company intends to use seaplanes fitted with skids to enable landing either on ice or water. The main base in Iceland will be Reykjavik, whence the route follows the south coast to the Faroe Islands, but in foggy weather a landing place would be available at Isafjordur, in the north-west of the island.

Air Lines for Anatolia

ANATOLIA is to join other European countries in having its own network of air lines and, incidentally, will thereby become an important link in the airways connecting Europe to Asia and East Africa. A contract has recently been signed between the Turkish Government and the American Curtiss-Wright Corp. for the provision of a system of airlines in Anatolia. Apart from the importance as a link between West and East, these new airlines should also achieve much in solving the Turkish transport problem, for the population of Anatolia is comparatively small and scattered and the building of new railways is not an economic proposition.

Australian Air Lines Change Hands

NEW ENGLAND AIRWAYS, LTD., recently completed arrangements whereby they purchased the entire plant of Queensland Air Navigation, Ltd., a company formed in April, 1930, to run air services between Brisbane and Townsville and Townsville and Cairns, and which ceased operations in 1931. The plant purchased included two 3-engined Avro monoplanes, capable of accommodating 10 passengers and freight; spare engines and parts, and two hangars. New England Airways operate a service between Sydney and Brisbane.

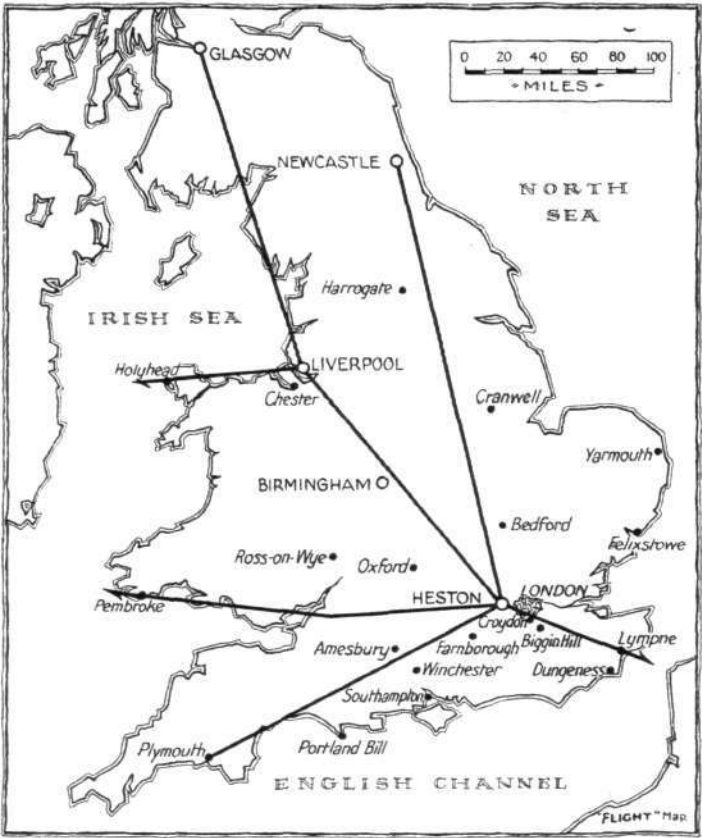
"Graf Zeppelin's" Busy Season

THE Hamburg-American Line announces the following sailing arrangements for the German airship *Graf Zeppelin*:—South American Service: From Friedrichshafen.—March 15-20; April 1-5; April 15-20; May 1-5. From Pernambuco.—March 20-25; April 5-10; April 20-25; May 5-10. During May to August the *Graf Zeppelin* will carry out: (a) Round trips of one day's duration over Switzerland (if sufficient participation—35 passengers); (b) charter trips of several days' duration, subject to special arrangements. From August to November six round trips to Pernambuco will be made. The duration of the trip from Friedrichshafen to Pernambuco will be 3 days (2 days' stay at Pernambuco) and from Pernambuco to Friedrichshafen 3½ to 4 days. The rates will be as follow:—One-way rate: \$475. Round-trip rate: \$860. Special aeroplane services from and to Berlin, and from and to Rio de Janeiro, will be arranged. Further information and bookings through Wm. H. Muller & Co. (London), Ltd., 66-68, Haymarket, London, S.W.1.

Airport News

THE A.A. WEATHER REPORTS

THE broadcasting station which has been established at Heston and is operated by the "A.A." is already proving of the greatest use to people who travel by air, and particularly to private owners. Several clubs and schools have already installed a wireless receiver so that these regular broadcasts may be received. Amongst these may be mentioned Haldon Aerodrome (Teignmouth 46) and Bristol Airport (Bristol 25144). The beauty of this arrangement lies in the fact that anyone who has not a wireless set will be able to ring them up and get the latest report over the particular route in which they are interested. As will be seen from the map, the reports are sent out—incidentally on wireless apparatus built and installed by The Standard Telephone & Cable Co., Ltd., Connaught House, Aldwych, W.C.2—for a series of routes which are amongst those most ordinarily used in the country. Further details of these weather reports were published in our issue for November 6 last, while as a matter of interest we reproduce below a completed form of a daily report as sent out from Heston.



AUTOMOBILE ASSOCIATION WEATHER REPORTS

Broadcast from the A.A. Meteorological Station at Heston, on 4.12.31, at 1530 G.M.T.

| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|-------------------------------------|---------------------|------|----------------------------|-------|---------------|------|-------------------|-------|
| | | | | Miles | | | | |
| EASTERN ROUTE TO THE NORTH | BEDFORD | — | — | — | — | — | — | — |
| | CRANWELL | 1300 | Cloudy | 12 | 8/10 | 2000 | S.W. by W. .. | 25—31 |
| | HARROGATE | 1300 | Rain showers | 12 | 1/10 | 2000 | S.W. | 8—12 |
| | NEWCASTLE | 1330 | Partly cloudy | 6 | 5/10 | 2000 | W. | 25—31 |
| WESTERN ROUTE TO THE NORTH | OXFORD | 1330 | Intermittent rain | 6 | 10/10 | 600 | S.W. by W. .. | 25—31 |
| | BIRMINGHAM | 1400 | Squally weather | 31 | 9/10 | 600 | S.W. | 25—31 |
| | CHESTER | 1300 | Intermittent rain | 31 | 8/10 | 1000 | W.S.W. squally | 25—31 |
| | HOLYHEAD | 1330 | Cloudy | 12 | 9/10 | 1000 | W.S.W. | 25—31 |
| | LIVERPOOL | 1330 | Rain showers | 31 | 5/10 | 1000 | W.S.W. | 25—31 |
| | RENFREW | 1300 | Intermittent rain | 6 | 10/10 | 1000 | S.W. by W. .. | 8—12 |
| WEST ROUTE | ROSS-ON-WYE | 1400 | Squally weather | 31 | 9/10 | 3000 | W. by S. | 32—38 |
| | PEMBROKE | 1330 | Intermittent drizzle | 1 | No low cloud. | | S.W. | 19—24 |
| SOUTH- WEST ROUTE | FARNBOROUGH | 1300 | Overcast | 31 | 10/10 | 1000 | S.W. by W. .. | 19—24 |
| | WINCHESTER | 1300 | Cloudy | 31 | 10/10 | 1000 | S.W. by W. .. | 19—24 |
| | SOUTHAMPTON | 1300 | Drizzle | 6 | 10/10 | 300 | S.W. by S. .. | 19—24 |
| | AMESBURY | 1300 | Intermittent rain | 12 | 10/10 | 1000 | W.S.W. | 25—31 |
| | PORTLAND BILL | 1300 | Intermittent drizzle | 6 | 10/10 | 1000 | W. by S. | 32—38 |
| | PLYMOUTH | 1300 | Intermittent drizzle | 3 | 10/10 | 300 | W. | 32—38 |
| SOUTH- EAST ROUTE | CROYDON | 1500 | Continuous rain | 3 | 9/10 | 600 | W.S.W. | 25—31 |
| | BIGGIN HILL | 1500 | Partly cloudy | 3 | 10/10 | 150 | W. | 19—24 |
| | LYMPNE | 1500 | Intermittent drizzle | 6 | 10/10 | 300 | S.W. by W. .. | 32—38 |
| | DUNGENESS | — | — | — | — | — | — | — |
| EAST ANGLIA | FELIXSTOWE | 1300 | Partly cloudy | 31 | 1/10 | 2000 | W. | 19—24 |
| | YARMOUTH | 1300 | Partly cloudy | 12 | No low cloud. | | W. by N. | 19—24 |
| LONDON AREA | HESTON | 1530 | Threatening sky | 10 | 7/10 | 1000 | W. by S. in gusts | 30—35 |
| | STAG LANE | — | — | — | — | — | — | — |
| | BROOKLANDS | — | — | — | — | — | — | — |

CROYDON

MUCH controversy has been aroused by the decision of the Air Ministry to ban all instructional flying at Croydon after August of this year. The firms affected are naturally very concerned, because it places them in a rather awkward position, for, having worked up a good connection over a number of years, they are now faced with an entire stoppage of business. They can hardly go to any other aerodrome, and hope to start where they have left off here, most of the recognised aerodromes having their own schools. There seems, therefore, no solution in that direction. Although it will undoubtedly hit these people hard, one must be unbiassed, and look at the Air Ministry side of the question. Very probably, the Air Ministry as a body regret having to do this, but they have to look at the point of view of public safety as the foremost factor. Croydon is essentially an Air Port, and with numerous pupils flying around the aerodrome, there is always a very real danger of a collision with one of the air liners. It may not happen for years, but the fact that the danger exists is very real and always present. One such accident would set back commercial aviation for many months; therefore, the possibility of any such accident must be removed. The Air Ministry are undoubtedly taking the only safe course, and all the large operating companies are, I think, in entire agreement, although at the same time sorry for the

people whose living has depended on instructional flying. They still have the joy riding, however, and one hopes they will have a good season to counteract this instructional loss.

Miss Winifred Brown passed through here, on her "Avian," on Sunday, en route for Paris. We have not seen her for some time, but her charming smile is still as infectious as ever.

Imperial Airways were again very busy on Saturday afternoon, joy riding with a Handley Page 42 and a Handley Page W.10, and the usual crowd of visitors inspected the aerodrome under the guidance of the Air Ministry guide.

The Short "Valetta" is being erected here. It is understood that she is now to be a landplane, and will probably be used by the Air Ministry for making various experiments in wireless, navigation, etc.

The radio beacon erected at the end of the white line is still causing heated controversy. Many pilots consider that the best site for this alleged navigational aid would be Mitcham Common.

There has been little of real interest during the past week, all services running to their normal schedule.

The traffic figures for the week were:—Passengers, 896; freight, 34 tons.

P. B.

HESTON AIR PARK

WORK on the new Heston buildings is now almost finished. They will be officially opened within the next two or three weeks. The additions consist of an hotel with lounges, bar, restaurant and pilots' room, and a number of bedrooms, each with its own bathroom.

The advantages of having an hotel actually on the aerodrome are many. Not only will it be a pleasant place to stay for a week-end, but will also be a convenience for pilots or passengers passing near London who wish to stay for one night. Further, we cannot think of a greater welcome after a long day's cross-country flying than a nice hot bath waiting for one, a restaurant ready with a meal at any time, then a comfortable lounge where one can sit and talk over the day's episodes. Again, what could be more convenient for an early morning start, say, for the Continent, than one's aeroplane right at the door, with Customs facilities and a weather bureau ready with the latest weather reports.

The following is a list of different types of machines now housed at Heston, so that visitors to the aerodrome are enabled to make comparison with the various makes of aeroplanes now in production:—

D.H. "Gipsy Moth," D.H. "Puss Moth," "Klemm" (many different engines), "Bluebird" (Hermes, Gipsy I), "Avian" (Hermes, Gipsy II and Genet Major), "Breda" (Gipsy I), "Widgeon" (Hermes), Comper "Swift" (Pobjoy), "Spartan" (Hermes and Gipsy II), "Martinside" (Nimbus), "Desoutter" (Hermes and Gipsy III), "Junker" (Jouches), "Hendy" (Hermes), Seagrave "Meteor" (two Gipsy III's), "Civilian Coupé" (Genet Major), D.H.53 (Bristol Cherub), "Redwing" (Genet), and "Spartan" mailplane (three Gipsy III's).

Monday, February 29.—The high wind kept many people from flying, but, in spite of this, among the few who did venture out was Miss Sale-Barker, who, accompanied by F/O. Streatfield, arrived from Upavon.

Tuesday, March 1.—The "Cutty Sark" (G-ABBC) arrived back from Croydon, where it had undergone certain modifications. It has been sold by Henly, Ltd., on behalf of Mr. Francis-Francis to British Amphibious Air Lines, Ltd.

Wednesday, March 2.—The "Cutty Sark" was flown to Hamble for conversion into a six-seater, when it is to be used for joy riding at Blackpool and taxi work to the Isle of Man.

An Airwork machine, chartered by Gaumont Films, in spite of a very thick mist, was flown to Cheltenham to collect films of the steeplechases. The thick weather gave Capt. Ferguson, the pilot, an excellent opportunity of putting his navigational teachings into practice; this he did with gratifying results.

An increasing number of people now attend the School

of Navigation, run by Capt. Ferguson in conjunction with the Flying School.

Thursday, March 3.—Hearty congratulations were given to Capt. V. H. Baker by his many pupils on returning to duty after an illness which had kept him confined to bed for nearly two weeks. His eagerness to be in the air was clear proof of his fondness for flying.

G-AAZM ("Puss Moth"), formerly the property of Mr. Nigel Norman, and now acquired by Mr. S. Davenport, looked extremely smart on coming out of Airwork, Ltd., paintshop with its new colouring of metallic blue and silver.

Friday, March 4.—Mr. Leslie Runciman, on his "Puss Moth" (G-ABLG), made a quick flight to Paris, bringing back a passenger.

G-ABEL, the "Puss Moth" of Lady Hay-Drummond-Hay, returned from Stag Lane fitted with a self-starter. This is the first "Puss Moth" in England to be so fitted, and greatly mystified many onlookers when the "prop" was seen dead in the air for some time and then, apparently, start again on its own. It is thought that many other machines will be so fitted, as it is a great convenience, especially to lady pilots. This is a car-type electric starter operated by a large accumulator, the whole outfit weighing something over 50 lb.

A good story is told of a pilot flying to Hamble fairly low owing to cloud, who saw a panel on a lawn reading, "Please stunt." This he did, when two charming ladies appeared, waved, and put another strip down, "Thank you so much." Feeling very bucked, he recounted his experience on arrival at Hamble, but received a shock when he was told, "O.K., but the chap living next door reports all low-flying aeroplanes to the Air Ministry."

Saturday, March 5.—G-AAVY, a Gipsy I, formerly the property of Mrs. Spencer Cleaver, returned and cleared Customs after a Continental tour commenced on January 13, demonstrating the Roberts patent aircraft stabiliser. Both the Italians and French have shown great interest in this invention, which was fully described in FLIGHT for January 15, 1932.

Sunday, March 6.—"Puss Moth" D-2235, purchased from de Havillands for export to Germany, cleared Customs for Cologne, the occupants being Herr Benz and Frau Saulmann. Great Britain being off the gold standard appears to be benefiting the sale of aircraft to foreign countries, and quite a number have cleared Customs recently for Holland, France and Germany.

The weather had a nice touch of spring, and instruction took quite a brisk turn. Air Com. Weir, accompanied by Mrs. Weir, chartered a plane and flew to Manston, while another was busy taking photographs in the Erith district, one of the places to be photographed being Walls' ice-cream factory, which made many people of the opinion that summer must have arrived.

Airisms from the Four Winds

The Couzinet Starts its Long-Distance Flight

AFTER being detained by bad weather for several days, the new Couzinet plane, type 33, which has been christened the *Biarritz*, took off from Le Bourget at 1.20 p.m. on March 6 last, to make the long-distance tour that will carry it halfway around the world, to which reference has previously been made in FLIGHT. The *Biarritz* is a cantilever type, low-wing, tri-motor monoplane, equipped with de Havilland "Gipsy" III, four-cylinder inverted air-cooled engines. The fuel tanks, seven in number, are installed in the wings and have a capacity of 2,150 litres (478 gallons) which furnish a flight radius of some 6,000 km. (3,750 miles), at a cruising speed of 200 km./hr. (160 m./hr.). The projected itinerary is from Paris to Noumea, the capital of New Caledonia, some 21,000 km. (13,000 miles). As the "meteo" provisions at the take-off were not favourable, the first section of the tour was limited to the flight Paris-Marseilles (Istres Airport). Weather permitting, the other sections of the tour will be as follows:—Marseilles-Tunis, 750 km. (466 miles); Tunis-Cairo, 2,250 km. (1,397 miles); Cairo-Basra, 1,600 km. (994 miles); Basra-Karachi, 1,850 km. (1,150 miles); Karachi-Calcutta, 2,250 km. (1,397 miles); Calcutta-Singapore, 2,500 km. (1,550 miles); Singapore-Sourabaya, 1,550 km. (963 miles); Sourabaya-Wydam, 1,950 km. (1,210 miles); Wydam-Normanton, 1,750 km. (1,086 miles); Normanton-Brisbane, 1,900 km. (1,180 miles); Brisbane-Noumea, 1,500 km. (932 miles).

The members of the crew are veteran airmen. Capt. Max Deve, the navigator, is also a well-known radio specialist. He is the Professor of Navigation at the Military "Ecole d'Application" at Versailles, and has made numerous flights throughout Europe. Charles de Verneilh, the pilot, is a former Aeropostale airman. He made the tour of the Mediterranean in company with Capt. Deve in 1930, flying 7,000 km. (4,400 miles) in five days. De Verneilh also piloted the plane of Lt. Col. Pierre Weiss from Paris to Addis-Abbeba to attend the coronation of the King of Ethiopia there, a short time ago. Georges Munch, the mechanic, has done service on several of the air lines.

23,000 Miles in Eight Weeks

WHEN Mr. C. A. Butler flew his little Comper "Swift" (Pobjoy engine) to Australia in record time, the event was, very rightly, regarded as a great achievement, and those

who had been in the habit of thinking of the "Swift" as merely a very attractive "toy" began to change their views. Immediately afterwards, Mr. Butler, without attracting any attention thereby, continued his demonstration of the qualities of the "Swift" by touring Australia and adding something like 12,260 miles to the England-Port Darwin distance. This means that in about eight weeks Mr. Butler flew his "Swift" 22,947 miles. Apart from the reliability of machine and engine thus demonstrated, the flight seems to show that the "Swift" is a very nice machine to fly. The record breaker might well have been content with reaching Australia, but apparently Mr. Butler only then really began to enjoy himself.

Something "Snappy" for the King's Cup

WE have been asked to inform readers who may wish to take part in the race for the King's Cup that the Comper Aircraft Co. are prepared to build, at a very reasonable price, a special racing "Swift" fitted with de Havilland "Gipsy III" engine. While such a machine should certainly be uncommonly fast, the designers do not regard it as in any way a "freak," and it would have a landing speed not so very much greater than many ordinary light planes, as the loaded weight would still be a good deal lower than that of Mr. Butler's long-distance Pobjoy-Swift. Readers interested in the suggestion are asked to communicate as soon as possible with the Comper Aircraft Co., Ltd., at Hooton Park Aerodrome, Wirral, Cheshire, as the work would have to be started within the next couple of weeks if the machine is to be ready in time.

R.Ae.S. Lecture Postponed

MR. E. F. RELF's lecture on the N.P.L. Wind Tunnel Experiments, which was originally to have been read before the Royal Aeronautical Society on March 10, has had to be postponed.

Canada Likewise!

THE Estimates for flying services in Canada have been tabled in the House of Commons at Ottawa, and show a reduction from the figure of \$5,442,000 last year to \$1,750,000, a cut of \$3,692,000. In addition, a reduction of \$1,075,000 has been made from expenditure by the Post Office on air mail services. Taking the two figures together they represent a cut of nearly 70 per cent. This is a very serious matter, for flying services in Canada, whether carried out by the Royal Canadian Air Force or by civilian pilots, are concerned with vital services to the population to an infinitely greater extent than flying in Great Britain can be said to be. Forest fire patrol is the most important of these services, survey is also very important, the air mails operate over very long distances, and the services to the frozen North have brought many of the amenities of civilisation within the reach of men and women there who would otherwise be almost entirely isolated. Even though Canada, like other countries, has to make economies in these hard times, a cut of 70 per cent. in flying seems to be excessive.

Employees at Cardington

SIR PHILIP SASSOON, Under-Secretary for Air, in reply to a question in the House on March 7, stated that the Air Ministry has been responsible for providing employment for 108 of the personnel previously employed at the Royal Airship Works, of whom 70, he was glad to say, had been found employment in other establishments of the Air Ministry.

The Airway Through East Africa

In reply to a question in the House on March 2, Sir P. Cunliffe-Lister stated that the Government of Uganda has expended £12,390; of Kenya, £47,300; of Tanganyika, £10,600; and of Northern Rhodesia, £21,500. The whole of this has been met by a free grant from the Colonial Development Fund. An additional amount of £2,777 has been expended by the Government of Tanganyika, the incidence of which is not yet decided.

10 Squadron, R.A.F., Re-Union Dinner

10 SQUADRON, R.A.F. (1914-1919), will hold its Fifth Annual Re-union Dinner at Ye Olde Pindar of Wakefield, Gray's Inn Road, on Saturday, March 12, at 7 p.m. In the past over 100 officers and other ranks have attended this popular re-union, and old members of the Squadron are cordially invited. Tickets 5s. 6d. from A. F. Williams, Rozel, Rickmansworth Road, Amersham, Bucks.



A TROPHY FOR BUTLER: In recognition of his flight from England to Australia in a Comper "Swift" last year, Mr. C. A. Butler was presented by the Vacuum Oil Co., Ltd., with a model of his machine. Mr. A. K. Oak Rhind, Director of the Vacuum Oil Co., Pty. Ltd. (left), is here seen presenting the trophy to Mr. Butler on his arrival at Essendon Aerodrome, Melbourne. Air Commodore Kingsford Smith will be seen on the right.

LLOYD'S REGISTER FOREGATHER

THE thirty-eighth annual reunion of the staff of Lloyds Register was the occasion of a dinner at the Mayfair Hotel on Saturday, March 5. Lloyds Register Cricket Club originally started this dinner, but it has now become the annual social event of the entire staff, attended by many important guests, including surveyors from all the important Outports.

MR. ANDREW SCOTT presided, and with him at the top table were Sir S. George Higgins (Chairman of Lloyds Register), Mr. J. Howard Glover (Chairman of the Classification Committee), Sir Percy Mackinnon (Chairman of Lloyds), Mr. W. J. McAlister (Chairman of the London General Shipowners' Society), Sir Frederick W. Lewis, and the following members of the Aviation Advisory Committee of Lloyds Register:—Mr. F. Handley Page, Capt. A. G. Lamplugh, Mr. Graham Mackinnon, and Mr. E. R. H. Hill. Others present included Lt. Col. F. C. Shelmerdine (Director of Civil Aviation), Mr. A. Maclean (Anglo-American Oil Co.), Mr. Cyril E. Lloyd, Mr. L. J. Hill (Senior Surveyor for Aircraft), Messrs. R. J. Sladden and P. J. Eccles (Hon. Secs., Lloyds Register Cricket Club), and Mr. P. E. Clement (Hon. Treasurer). Among the aviation guests were Mr. H. E. Broadsmith (Saunders-Roe), Mr. J. J. A. Gilmore (Directorate of Aeronautical Inspection), Mr. F. T. Hearle (de Havilland Aircraft), and Mr. T. C. L. Westbrook (Saunders-Roe).

The Chairman, after reading many telegrams from far-distant members regretting their inability to be present, in proposing the health of "Our Club and Patrons," gave a short history of the cricket club during the last season. He referred with regret to the absence owing to illness of Mr. Ruck-Keene, the Society's General Engineer Surveyor. He said, when referring to the patrons, that the club did a great deal to promote good fellowship and the team spirit by means of its matches. Reference was also made to the growth of tonnage on the books of Lloyds Register and the fact that the well-known 100 A1 classification was still the most widely sought after; moreover, it embraced, he continued, within their fold, a greater value of tonnage than all the classification societies of other countries put together.

SIR GEORGE HIGGINS, in reply, paid tribute to the technical staff of the Register, particularly for the way in which they had faced the present time of depression; also for the work they had done in the matter of research, so that they had been able to keep abreast of all the latest developments in construction. Sir George also referred to his appointment on the Board of Referees of the Royal Mail Reorganisation Scheme, and suggested that his position of Chairman of Lloyds Register had a great deal to do with that appointment. He therefore felt that his being chosen was a compliment to the Register.

MR. A. A. A. CHALMERS proposed the toast of "Our Guests" in a particularly humorous speech. He referred to the fact that the toast was coupled with the names of three gentlemen, the first Mr. Cyril E. Lloyd, whose activities, he said, were so varied and tremendous that he considered him a representative who could properly reply for all the guests. The second on the list, Mr. Handley Page, who represented aircraft. Mr. Chalmers then made reference to the guests in the aviation industry, many of whom were constructors or constructors' representatives, and said he would like his hearers to know that they owed these constructors a very great deal, since they had given the young engineer surveyors the opportunity of training, so that these gentlemen, when they went abroad, would

be able to tackle any aircraft problems they would meet. The last named on the list was Dr. Pickworth, the Principal Surveyor at Sunderland, who was replying on behalf of the Outport members, many of whom were there as most welcome guests.

MR. CYRIL E. LLOYD, in his reply, hoped that another branch of the Lloyd family which he represented would knock the heads off the club at cricket during the ensuing season. Regarding the origin of the Lloyd family, he had his doubt as to whether it was a *coffee* house from which the great Lloyd institution sprang.

MR. HANDLEY PAGE remarked that on former occasions he had always spoken on behalf of civil aviation; he was therefore exceedingly pleased to be able to reply as one of the guests, for he had spoken previously neither "civilly" nor on the subject of aviation. Out of consideration for Mr. Scott, he had looked up a biblical text which he was going to quote, "Be not forgetful to entertain strangers, for thereby some have entertained angels unawares." He said that, as they had Col. Shelmerdine, the Director of Civil Aviation, there that evening, who was especially charged with the safety of all while in the air, he thought the toast very appropriate. He thanked Mr. Chalmers for his remarks, for if there is one thing which aviation does welcome, it is the Lloyds surveyors, who have come amongst them with a view to helping extend the branch called Civil Aviation. Finally, he reiterated the words of one of the singers of the evening, which were: "I come like water and like wind I go." Then, referring to Lloyds Register, he said: "You started on the sea; it may be you will end up with your major activities in the air, and, believe me, no one will more welcome the transfer of the activities of Lloyds Register, and the accompaniment of the goodwill which it has throughout the whole world than the aircraft industry."

DR. PICKWORTH, who also replied, thanked Mr. Chalmers most sincerely for the generous terms in which he had referred to them. He said that those from the Home ports derived inspiration and enthusiasm through the present opportunity of closer co-operation with the members of the Committee.

SIR FREDERICK LEWIS, proposing the toast of "Our Chairman," suggested that the toast he was about to submit was really the toast of the evening, and its virtue lay particularly in the personality of the gentleman whose name he was going to associate with it. He then followed with a brief history of the career of Mr. Andrew Scott from the time he commenced with Lloyds Register in 1869. It will be seen, he said, from this that Mr. Scott was in his 63rd year of office. Sir Frederick regretted that he himself could not attain anything like Mr. Scott's record, in his own business. Mr. Scott had been associated longer and more intimately with Lloyds Register than any other man, and he thought it right to say that he had also had more to do with the progress of Lloyds Register than any other man.

In replying to the toast, Mr. SCOTT said Sir Frederick was known in the City of London as one of the ablest of business men, but, for such a young man as Sir Frederick, he was sorry to see he lived so much in the past. "1931 is good enough for us, he averred, and we are going to build something for the future. We look to the future, and we look forward, whether we win or whether we lose, to playing the game."

By way of interlude some excellent entertainers made the "wait" between speeches seem all too short.

Death of Air Commodore R. C. M. Pink, C.B.E.

ALL those air correspondents who have had the task of following the Air Exercises in recent years will retain a very warm feeling for the courtesy, geniality, and practical helpfulness of Air Commodore R. C. M. Pink, C.B.E., who on several occasions was in active charge of the Press arrangements, and who smoothed the path of the correspondent in a way which he does not always experience when trying to follow the course of a mimic or real war and to explain its course to the public. After one of his pithy and witty summaries of a day's activities to a crowd of correspondents, one of them exclaimed to Group Captain (as he then was) Pink: "Sir, you ought to have been a journalist!" The news of his death a few days ago at the early age of 43 will be received with

as deep regret among those correspondents who knew him as it will be in the Royal Air Force. Air Commodore Pink entered the Royal Navy through H.M.S. *Britannia* in 1904, and during the war he first saw service in submarines.

Subsequently he joined the Air Department of the Admiralty, and then qualified as an airship pilot. Later he turned his attention to aeroplanes, and won a great reputation in India in 1923 and the following years by the ability with which he directed a series of air operations against the Wazirs. He has since held many responsible appointments, the last of which was the command of the station headquarters at Manston. Here his health broke down, and since July of last year he has been on the non-effective list.

The Industry

BOULTON & PAUL HANGAR CONSTRUCTION

WHEN planning the hangar and social accommodation for a new aerodrome it is a decided advantage to be able to approach a firm of constructional engineers who are also the designers and operators of aircraft, for they obviously understand the specific requirements of an aerodrome.

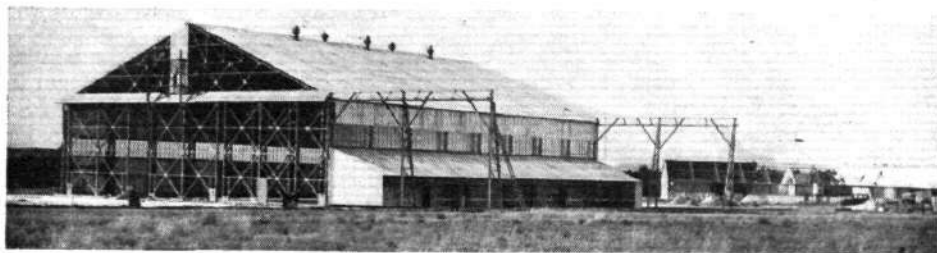
A firm of this type is Boulton & Paul, Ltd., of Norwich, who need as little introduction as constructional engineers as they do as aircraft manufacturers. Their steel-frame construction is utilised for a wide variety of accommodation purposes in all parts of the world. Many of the huge garages for motor-coach fleets which have sprung into existence throughout this country, following the phenomenal development of road passenger services, are B. & P. structures, as are large numbers of factories and warehouses, hangars and club-houses.

Their constructional work at aerodromes is typified in the hangars of Air Service Training, Ltd., at Hamble; the Air Ministry hangar at Wittering; also those at the Rand Air Port, Germiston, Transvaal; and in Rhodesia are examples of modern civil types.

Advantages of Steel

The advantages of steel construction for aerodrome buildings may be summarised as follow:—

1. Steel work provides a fireproof structure, and it is durable.
2. It is specially suited to adaptation and expansion, and can even be moved bodily from one position to another.
3. It permits radical alteration in internal planning with a minimum of expenditure. This applies to administration buildings as well as hangars.
4. Partitions can be erected which are easily removable and require a minimum of internal supports.
5. Steel work is also particularly suitable for wireless masts, automatic wind indicators, and airway and aerodrome beacon pylons.



The large hangar built by Boulton & Paul, Ltd., for the Rand Air Port, Germiston, in the Transvaal. In this photograph the doors are not yet covered.

6. With steel construction it is possible to obtain the largest span with the least height, thus providing the minimum of obstruction to incoming and outgoing aircraft, a feature of great importance at an aerodrome.

7. For the roofs and side coverings there is a choice of several kinds of material, for example, galvanised corrugated sheets, asbestos corrugated sheets, corrugated "Cellactite" sheeting and Robertson's metal sheeting.

Construction Details

A typical specification of a Boulton & Paul hangar provides for stanchions of rolled-steel joists complete with caps and bases; roof trusses of steel angles and flats complete with all gussets, shoes, cleats, etc.; purlins and girts of steel angles; and bracing wherever it is considered necessary. The doors vary according to the size and number of aircraft to be housed, and they are of steel-framed design covered with galvanised corrugated sheeting, running on a top rack with guides and guide rail at the bottom. With very high doors it is sometimes better to have them running on a bottom rail track with top guides.

For the roofing the sheeting used is 22 gauge, and for the sides, ends and door 24 gauge, all laid single side laps and 6-in. end laps, with all the necessary fittings plus 5 per cent. to spare for fixing. All the necessary bolts and nuts are provided plus 5 per cent., but the bolts connecting timber to steel are not included. All the ungalvanised steel work is given one coat

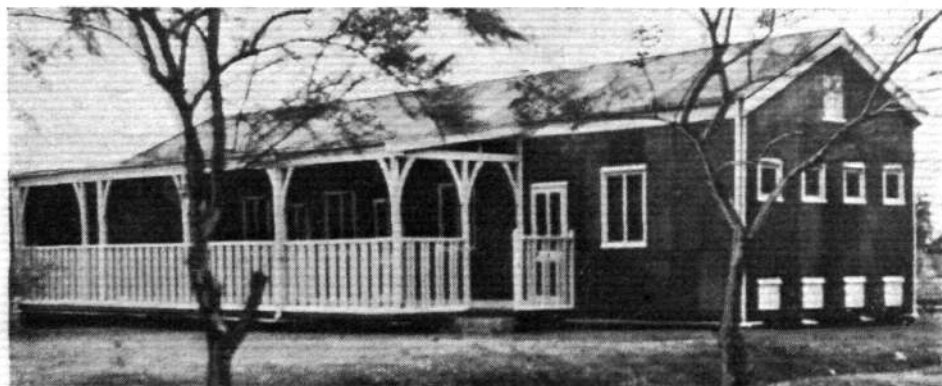
of paint before despatch, and is always tested before despatch to ensure correct fitting. Erection marks are made for guidance when assembling on the site. Galvanised gutters of suitable section with stop ends, outlets and straps for fixing are provided, also rain-water pipes with shoes, bends and clips for fixing. When a shed is erected in a tropical country windows are usually placed in the sides, and these are supplied with putty and pegs. In other climates the light can be obtained in the roof by means of patent glazing or glass on puttied steel T-bars.

Typical Designs

Boulton & Paul aerodrome construction is designed to meet individual requirements when requested, but amongst their general plans of hangars are the following:—A small hangar to house the light aeroplane, 30 ft. by 30 ft., which should store three machines with folded wings; a larger type 90 ft. long by 60 ft. wide by 15 ft. high, with provision for workshops, etc., in the form of a lean-to at the back, 10 ft. wide inside, and the doors in front giving a clear opening of 45 ft. by 15 ft. high. Another hangar is 100 ft. long by 50 ft. wide, is divided into two sections by a partition, each of which provides a clear doorway space of 50 ft. by 20 ft. For machines of big dimensions there is a hangar 328 ft. long and 82 ft. wide, the whole area inside being free of obstructions. Only two stanchions are employed along the front, which gives three openings each 109 ft. 4 in. wide.

Boulton & Paul, Ltd., are the only aircraft manufacturers with a constructional engineering department, and their valuable experience in the design and construction of aerodrome buildings, including steel wireless towers—which they have supplied in all parts of the world—ought not to be overlooked, for example, by the many Town Councils now contemplating those long-delayed municipal airports.

These Councils have no need to worry over their inexperience of the specific needs of an airport while such experts are at their command. The London office of Boulton & Paul, Ltd., is 139, Queen Victoria Street, E.C.4, and their Aviation Manager is at the service of all responsible enquirers.



The rest house erected on the Cairo to Capetown air route at Malakal by Boulton & Paul, Ltd., of Norwich.

THE ROYAL AIR FORCE

London Gazette, March 1, 1932.

General Duties Branch.

The follg. Pilot Officers are promoted to rank of Flying Officer (Jan. 26).—A. G. Cleland, M. B. Edwards. Wing Commander R. M. Field is placed on half-pay list, scale B (March 1); Flight Lieut. D. H. Carey is placed on half-pay list, scale B, from Feb. 29 to March 12 inclusive; Flying Officer L. R. S. Freestone is placed on half-pay list, scale B, from Feb. 21 to Feb. 28 inclusive; Squadron Leader H. G. R. Malet is placed on retired list at his own request (Feb. 24); Flight Lieut. R. Melbourne resigns his permanent commn. (March 1). The short service commn. of Pilot Officer on probation M. A. Lunnon is terminated on cessation of duty (Jan. 20).

Chaplains Branch

The Rev. A. W. Brown is placed on retired list on account of ill-health (March 1).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commanders: A. H. S. Steele-Perkins, O.B.E., to Air Ministry (D.P.S.) 15.2.32. for Personnel Staff duties, vice S/Ldr. J. F. Gordon, D.F.C. A. Coningham, D.S.O., M.C., D.F.C., A.F.C., to H.Q. Middle East, Cairo, 17.2.32; for Air Staff duties at Khartoum, vice G/Capt. W. S. Douglas, M.C., D.F.C., I. T. Lloyd, to Air Ministry (D. of T.), 22.2.32, for Air Staff duties, vice S/Ldr. P. H. Mackworth, D.F.C. H. M. Probyn, D.S.O., to School of Photography, S. Farnborough, 12.2.32, to Command, vice W/Cdr. A. H. S. Steele-Perkins, O.B.E.

Squadron Leaders: G. E. Livock, D.F.C., A.F.C., to Central Flying School, Wittering, 19.2.32, for flying duties, vice W/Cdr. A. Coningham, D.S.O., M.C., D.F.C., A.F.C.; F. H. E. Reeve, to H.Q., R.A.F., Transjordan and Palestine, 4.2.32, for Signals Staff duties, vice F/Lt. G. N. Coward.

Flight Lieutenants: C. F. Le P. Trench, to H.Q., R.A.F., India, New Delhi, 27.1.32; H. I. Cozens, to No. 25 (F) Sqdn., Hawkinge, 16.2.32; E. R. C. Hobson, D.F.C., to No. 57 (B) Sqdn., Netheravon, 21.2.32; C. H. Harrison, to No. 60 (B) Sqdn., Kohat, India, 24.1.32. J. W. Lissett, to No. 27 (B) Sqdn., Kohat, India, 30.1.32; F. T. Eades, D.F.C., to Air Armament School, Eastchurch, 23.2.32; S. G. Conolly, to Air Armament School, Eastchurch, 22.2.32; F. Beaumont, to No. 57 (B) Sqdn., Netheravon, 15.2.32; H. E. Forrow, to No. 41 (F) Sqdn., Northolt, 23.2.32; J. S. Harrison to No. 23 Group H.Q., Grantham, 20.2.32; J. M. Cohn, to Aircraft Depot, Karachi, India, 23.2.32; A. W. Elias, to Aircraft Depot, Karachi, India, 23.2.32; H. L. Rough, D.F.C., to No. 13 (AC) Sqdn., Netheravon, 29.2.32; C. Crawford, to No. 15 (B) Sqdn., Martlesham Heath, 29.2.32; C. H. Brill, to No. 201 (FB) Sqdn., Calshot, 4.1.32; W. A. D. Brook, to Hdqrs. Inland Area, Stanmore, 7.1.32; P. J. A. Hume-Wright to No. 201 (FB) Sqdn., Calshot, 4.1.32; W. F. Lovering, to Marine Aircraft Experimental Estab., Felixstowe, 4.1.32.

Flying Officers: J. D. Richardson, to Superintendent of Reserve, Hendon, 16.2.32; E. S. Greenwood, to No. 2 Flying Training School, Digby, 18.2.32; J. M. Waddell, to No. 448 (FSR) Flight, Mediterranean, 19.2.32; R. I. Johnson, to R.A.F. Base, Gosport, 22.2.32; F. J. Taylor, to No. 502 (Ulster) (B) Sqdn., Aldergrove, 25.2.32; C. D. C. Boyce, to No. 210 (FB) Sqdn., Pembroke Dock, 27.2.32; G. Nelson, to No. 28 (AC) Sqdn., Ambala, India, 23.2.32; B. P. Reynolds, to No. 5 (AC) Sqdn., Quetta, India, 23.2.32; W. J. Brighty, to No. 5 (AC) Sqdn., Quetta, India, 23.2.32; R. W. G. Love, to No. 28 (AC) Sqdn., Ambala, India, 23.2.32; H. C. O'Loughlin, to No. 31 (AC) Sqdn., Quetta, India, 23.2.32; W. A. Ashcroft, to No. 31 (AC) Sqdn., Quetta, India, 23.2.32; L. A. Bullard, to No. 5 (AC) Sqdn., Quetta, India, 23.2.32; R. G. E. Catt to Aircraft Depot, Karachi, India, 23.2.32; L. J. M.

ROYAL AIR FORCE RESERVE RESERVE OF AIR FORCE OFFICERS

General Duties Branch

Flying Officer E. A. M. Norie relinquishes his commn. on appointment to a commn. in Regular Army (Nov. 11, 1931); Flying Officer C. J. Chabot relinquishes his commn. on completion of service and is permitted to retain his rank (April 20, 1931).

SPECIAL RESERVE

General Duties Branch

Flying Officer W. A. W. Fitzsimons relinquishes his commn. on account of ill-health (March 2).

AUXILIARY AIR FORCE

General Duties Branch

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON. Flight Lieutenant C. L. Knox, V.C., relinquishes his commn. on completion of service (Nov. 23, 1931).

White, to No. 28 (AC) Sqdn., Ambala, India, 23.2.32; R. G. Wilde, to No. 20 (AC) Sqdn., Peshawar, India, 23.2.32; C. C. O'Grady, to No. 5 Flying Training School, Sealand, 29.2.32; W. Halmshaw to No. 201 (FB) Sqdn., Calshot, 4.1.32.

Pilot Officers: E. J. N. Heaven, to No. 207 (B) Sqdn., Bircham Newton, 19.2.32; M. W. S. Robinson, to Aircraft Depot, Karachi, India, 23.2.32; D. Addenbrooke, to Aircraft Depot, Karachi, India, 23.2.32; H. W. A. Chesterman, to Aircraft Depot, Karachi, India, 23.2.32; N. C. S. Rutter, to Aircraft Depot, Karachi, India, 23.2.32; A. M. Bowman, to No. 33 (B) Sqdn., Bicester, 20.2.32; A. J. Draper, to No. 54 (F) Sqdn., Hornchurch, 20.2.32; J. G. Glen, to No. 57 (B) Sqdn., Netheravon, 20.2.32; A. D. Grace, to No. 17 (F) Sqdn., Upavon, 20.2.32; R. A. R. Rae, to No. 33 (B) Sqdn., Bicester, 20.2.32; T. J. MacDermot, to No. 204 (FB) Sqdn., Mount Batten, 4.1.32.

Stores Branch

Squadron Leader W. A. O. Honey, to No. 23 Group H.Q., Grantham, 22.2.32 for Stores Staff duties.

Flight Lieutenants: S. R. L. Poole, to No. 4 Stores Depot, Ruislip, 29.2.32. L. Horwood, M.C., to School of Army Co-operation, Old Sarum, 29.2.32.

Flying Officer F. C. Read, to No. 501 (City of Bristol) (B) Sqdn., Filton 22.2.32.

Accountants Branch

Squadron Leader K. R. Money, O.B.E., to Home Aircraft Depot, Henlow 20.2.32, for Accountant duties, vice F/Lt. J. Sullivan.

Flight Lieutenant R. W. Collinson, to School of Naval Co-operation, Lee-on-Solent, 21.2.32.

Flying Officers G. E. Shirley, to School of Army Co-operation, Old Sarum, 19.2.32; C. L. Dook, to H.Q., Inland Area, Stanmore, 16.2.32.

Medical Branch

Wing Commander: W. A. S. Duck, O.B.E., to H.Q., Iraq Command, Hinaidi, 20.2.32; for duty as Deputy Principal Med. Officer, vice W/Cdr. P. M. Keane.

Squadron Leaders: A. F. Rook to Princess Mary's R.A.F. Hospital, Halton, 27.2.32; for duty as Med. Officer; T. McClurkin, to R.A.F. Pathological Lab., Halton, 27.2.32; for duty as Med. Officer, vice S/Ldr. A. F. Rook.

NAVAL APPOINTMENT

The following appointment has been made by the Admiralty:—Lieut. R. A. Kilroy (F/O., R.A.F.), to Cornwall (March 1).



AIR MINISTRY NOTICES TO AIRMEN, SERIES A

No. 2 of the year 1932. Flights Abroad by British Pilots: Importance of Carriage of Correct Documents. (162791/32.)

COMPLAINTS have been received that civil pilots have frequently arrived in Germany from abroad without being in possession of necessary documents such as Pilots' Licences and Certificates of Airworthiness, thus causing considerable inconvenience both to the German authorities and to themselves.

The attention of pilots is therefore drawn to the necessity of ensuring, before leaving on a flight abroad, that all documents in respect of the aircraft and its crew, passengers and cargo which are prescribed in connection with international air traffic by the Air Convention or by the individual regulations issued by the country or countries to be visited, are actually carried in the aircraft.

In cases of doubt as to what documents are necessary in particular cases, the required information can be obtained from the Secretary (C.A.4), Air Ministry, Adastral House, Kingsway, London, W.C.2; the Automobile Association (Aviation Department), Farnham House, New Coventry Street, London, W.1; National Flying Services, Ltd., London Air Park, Feltham, Middlesex; or the Royal Aero Club, 119, Piccadilly, London, W.1.

February 4, 1932

No. 3 of the year 1932. Flight on Croydon—Lympe Air Route in Conditions of Bad Visibility. (77772/30.)

In order to obviate, in conditions of bad visibility, the danger of collision between civil and R.A.F. aircraft, civil aircraft shall not, in any circumstances, when the height of the lowest cloud is less than 1,000 ft. above sea level or the horizontal visibility is less than 1,000 yards, follow the normal Croydon—Caterham—Edenbridge—Lympe route, but shall use either of the routes:—

(i) Croydon—Mersham—Edenbridge.

(ii) Croydon—Chelsfield—Shoreham—Otford—Wrotham Valley.

or, where necessary, the following route, flight in such case being, if practicable, above the fog, or, in any event, as high as possible:—

(iii) [a] rhumb-line course between Croydon, Chelsfield and Lympe.

When conditions are such as to necessitate the alternative routes being used, the Chief Aerodrome Officer, Croydon aerodrome, will issue a "Fog Notice" as under:—

(a) To all civil aircraft flying in the vicinity of the normal Croydon—Lympe route, by means of radio-telephony broadcast on 900 metres wave-length.

(b) to all aircraft companies operating from Croydon aerodrome, with a view to all departing aircraft being warned.

When conditions of bad visibility cease to exist, the Chief Aerodrome Officer, Croydon aerodrome, will issue the necessary notification in a similar manner.

Aircraft en route from Croydon to Lympe or vice versa shall on receipt of the "Fog Notice," immediately resort to one of the three routes given in (i), (ii), and (iii) above. In the event of route (iii) being selected, the Chief Aerodrome Officer, Croydon aerodrome, shall, whenever possible, be informed, by radio-telephony.

When the specified conditions of bad visibility prevail on the Croydon—Lympe air routes, pilots of aircraft not equipped with radio shall, before taking off to fly over any portion of that route, request the official in charge of the aerodrome of departure to advise by telephone either the Chief Aerodrome Officer, Croydon aerodrome, or the Aerodrome Officer in Charge, Lympe aerodrome, of the particular alternative route [i.e., one of the three routes given in (i), (ii), or (iii) of para (1) above] which he intends to follow. The official in charge of the aerodrome of departure should ensure that such information, together with the time of departure of the aircraft, is telephoned to Croydon or Lympe, as the case may be, immediately the aircraft has left.

In order to reduce the risk of collision with civil aircraft, pilots of R.A.F. aircraft have been warned to avoid as far as possible flying over the routes mentioned above in conditions of bad visibility.

Cancellation.—Notice to Airmen, Series A, No. 5 of 1931, is hereby cancelled.

Royal Air Force Club. Annual General Meeting.

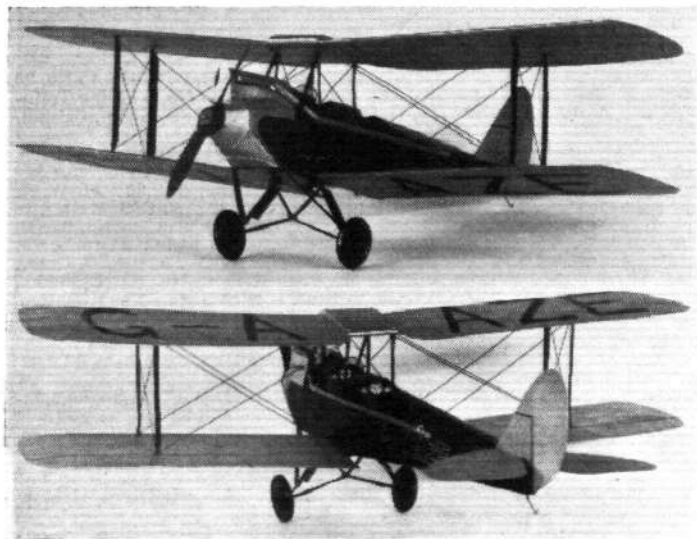
The Annual General Meeting of the Royal Air Force Club will take place at 6 p.m. on Wednesday, March 16, 1932.

Models

SCALE MODELS

TO meet the demand of those who wish to possess accurate scale models of various types of aircraft for ornamental or souvenir purposes—not for flying—Aeromodels, of Hooton Road, Willaston, Wirral, Cheshire, are producing a series of true-to-scale models to be built up from parts. A completed model of the first of the series—a “Gipsy Moth”—is shown in the accompanying illustration, and it is intended to publish at intervals true-to-scale models of other well-known types, to enable aircraft enthusiasts to build their own fleet of aeroplanes in miniature. The next model will be the Comper “Swift.”

These models, which are constructed mainly from stiff card, are more than toys, calling for a certain amount of



A True-to-Scale Model of the D.H. “Gipsy Moth” constructed from parts supplied by Aeromodels.

care and skill in their construction—but the finished model well repays the time and patience expended upon them, for the result is both realistic and accurate, as may be judged from the illustration.

Actually, the construction of these models is comparatively simple—as we can say from personal experience—and it is only necessary to expend the aforesaid time and patience and closely follow the instructions. Should the constructor accidentally spoil any particular part in the process of construction, Aeromodels can supply replacements at reasonable charges. The price of a complete set of parts for the “Gipsy Moth” shown is only 3s.

D.H. Sales

DE HAVILLAND aircraft will in future be sold under a new distribution scheme in England. In the past they have, whilst selling direct, also granted trade discounts to a number of dealers, none of whom were allotted exclusive territories. With the exception of business with the Air Ministry and the Royal Household, the whole of D.H. sales in England will be handled by three concerns, and they in turn will be responsible for the organisation of sales throughout their own particular areas. These distributors and their areas are:—

BRIAN LEWIS & CO., LTD.

London north of the Thames and the following Counties:—Middlesex, Hertford, Essex, Bedford, Cambridge, Suffolk, Norfolk, Huntingdon, Lincoln, Nottingham, Derby, Chester, Lancashire, York, Westmorland, Durham, Cumberland, and Northumberland.

PHILLIPS & POWIS AIRCRAFT (READING), LTD.

The Counties of:—Buckingham, Berkshire, Oxford, Northampton, Warwick, Leicester, Rutland, Worcester, Gloucester, Stafford, Shropshire, Hereford, Monmouth, Glamorgan, and Somerset, north of the Railway Line connecting Clevedon, Axbridge, Wells, Shepton Mallet and Frome.

BROOKLANDS AVIATION, LIMITED.

London south of the Thames and the following Counties:—Kent, Sussex, Surrey, Hampshire, Wilts, Dorset, Devon, Cornwall, and Somerset, south of the Railway Line connecting Clevedon, Axbridge, Wells, Shepton Mallet and Frome.

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda: No. 1,400 (Ae. 521-T. 3,131). *Experiments on a Model of the Airship R.101*. By R. Jones and A. H. Bell. May, 1931. Price 1s. 9d. net. No. 1,417 (Ae. 538-T. 3,118). *Scale Effect on High Tip Speed Airscrews*. By A. S. Hartshorn and G. P. Douglas. May, 1931. Price 1s. net. No. 1,425 (Ae. 545-T. 3,149). *Models for the Determination of Critical Flutter Speeds*. By W. J. Duncan. July, 1931. Price 4d. net. London: H.M. Stationery Office, W.C.2.

“*What We Make*.” Ransomes & Rapier, Ltd., Water-side Works, Ipswich.

Brassey's Naval and Shipping Annual, 1932. London: Wm. Clowes & Sons, Ltd. Price 25s.

Angles on Practical Flying. By P. W. F. Mills. London: Crosby Lockwood & Son. Price 4s. 6d. net.

NEW COMPANIES REGISTERED

BRITISH AMPHIBIOUS AIRLINES, LTD., 22, Birley Street, Blackpool.—Capital, £3,500 in £1 shares. Acquiring the benefits of an agreement dated February 4, 1932, between the Borough of Blackpool of the one part and R. Monk, J. E. Horsman and Fanny Booth of the other part, with regard to the use of the sea and foreshore at Blackpool for conducting flights in an amphibious flying boat; manufacturers of and dealers in aeroplanes and aircraft of all descriptions; to make flights, give lessons and instruction in flying, etc. First directors: J. E. Horsman, “Leewood,” Newton Drive, Blackpool (governing director of John Horsman, Ltd.); Mrs. F. Booth, “Rockdene,” Second Avenue, Broadway, Blackpool, wholesale and retail confectioner; R. Monk, 182, South Park Drive, Blackpool, aviator.

STOYLE, LTD., 174, Corporation Street, Birmingham.—Capital, £2,250 in £1 shares. Acquiring patents and any other rights for inventions relating to internal combustion engines, steam engines, aeroplanes, airships, motor boats, etc. Directors: F. J. S. Jones, “Moreton,” New Road, Porthcawl, Glam., engineer; F. D. S. Simons, “Penbryn,” Cefn Road, Brecknock, solicitor; G. H. Fletcher, 87, Harborne Road, Harborne, Staffs., secretary.

EASTERN AIR TRANSPORT LIMITED, Colne Lodge, Clarence Street, Staines, Middlesex. Capital: £1,000 in £1 shares. Objects: To carry on the business of air transport services of all kinds, garage and car park proprietors, aircraft constructors, motor engineers, etc. Directors: G. A. Pennington, 8, Knowle Park Avenue, Staines, Middlesex, and M. D. L. Scott, Kensington Palace Mansions, W.8.

CIERVA AUTOGIRO CO., LTD. (Increase of Capital), Bush House, W.C.2.—The nominal capital has been increased by the addition of £50,000 beyond the registered capital of £155,000. The additional capital is divided into 50,000 8 per cent. participating non-redeemable preference shares of £1 each, ranking *pari passu* with existing shares.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. (The numbers in brackets are those under which the Specification will be printed and abridged, etc.).

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- 27,302. E. G. BUDD MANUFACTURING CO. Metal truss structures, for use in aircraft. (366,965.)
- 29,618. W. HELMORE. Methods of using fuels in i.c. engines. (366,947.)
- 33,602. G. W. HARDING. Aircraft. (366,953.)
- 34,682. J. D. SIDDELEY. Aircraft engine-cowling. (367,043.)
- 34,931. SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT, LTD. and J. LLOYD. Aircraft wing spars. (367,048.)
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- 1 506. G. L. R. J. MESSIER. Radiator for aeroplanes. (367,122.)
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- 18,421. H. JUNKERS. Apparatus using infra-red rays for navigating when visibility is low. (367,283.)
- 19,913. M. CHARLES. Cast wheels for use in connection with aeroplanes (367,291.)

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